PRICE LIST

OF

PLOUGHS

AND

FITTINGS FOR PLOUGHS

AND OTHER IMPLEMENTS,

MANUFACTURED BY

JAMES & FREDK. HOWARD,

BRITANNIA IRON WORKS,

BEDFORD.

LONDON OFFICE:

4, CHEAPSIDE, E.C., THREE DOORS FROM ST. PAUL'S.

1869.

PLOUGH SHARES.

HOWARD'S

PATENT CHILLED SHARES

HARDENED BY A PROCESS FOR WHICH J. & F. HOWARD

HAVE OBTAINED

HER MAJESTY'S ROYAL LETTERS PATENT,

WEAR SHARPER AND LAST LONGER

THAN ANY SHARES PRODUCED BY ANY OTHER PROCESS

EVER YET DISCOVERED.

THEY ARE MADE OF VARIOUS SHAPES AND SIZES TO SUIT ALL

DESCRIPTIONS OF SOIL.

CATALOGUE

OF

AGRICULTURAL

MACHINERY,

AND

PATENT

SAFETY BOILERS,

MANUFACTURED BY

JAMES & FREDK HOWARD,

BRITANNIA IRON WORKS,

BEDFORD.

LONDON OFFICE:

4, CHEAPSIDE, E.C., THREE DOORS FROM ST. PAUL'S.

1869.

INDEX.

PRIZES AWARDED

TO

J. & F. HOWARD

BY THE

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

FIFTY-THREE FIRST PRIZES

FOR THE

BEST PLOUGHS FOR LIGHT LAND,

BEST PLOUGHS FOR HEAVY LAND,

BEST PLOUGHS FOR GENERAL PURPOSES,

BEST SWING PLOUGHS,

BEST RIDGING PLOUGHS, BEST SUBSOIL PLOUGHS,

BEST HARROWS, BEST STEAM HARROWS,

BEST STEAM CULTIVATOR,

BEST DETACHED WINDLASS FOR STEAM CULTIVATION,

BEST HORSE RAKES, BEST HAYMAKERS,

AND BEST HORSE HOES;

ALSO THE

GOLD MEDAL AND OTHER PRIZES,

FOR STEAM CULTIVATING MACHINERY.

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

LEICESTER MEETING, 1868.

TRIAL OF STEAM PLOUGHS.

AFTER THE MOST SEVERE TRIALS OF STEAM CULTIVATORS EVER MADE,

J. & F. HOWARD,

WITH THE ONLY SET OF STEAM CULTIVATING APPARATUS THEY EXHIBITED, WON

THE FIRST PRIZE

FOR THE BEST APPLICATION OF STEAM POWER ADAPTED TO FARMS OF MODERATE SIZE,

AGAINST THREE SETS ON THREE DIFFERENT SYSTEMS BY OTHER MAKERS.

THE FOLLOWING PRIZES FOR STEAM CULTIVATING MACHINERY WERE ALSO AWARDED TO J. & F. HOWARD AT THE ABOVE MEETING:—

THE FIRST AND ONLY PRIZE FOR THE BEST 5-TINED STEAM CULTIVATOR.

THE FIRST AND ONLY PRIZE FOR THE BEST STEAM HARROWS.

THE FIRST AND ONLY PRIZE FOR THE BEST DETACHED WINDLASS FOR STEAM CULTIVATORS.

ALSO, AT THE

GREAT TRIALS OF PLOUGHS, &c.,

AT THE ABOVE MEETING,

J. & F. HOWARD GAINED THE FOLLOWING

SIGNAL TRIUMPHS

OVER ALL OTHER MAKERS:—

THE FIRST PRIZE FOR THE BEST WHEEL PLOUGH FOR GENERAL PURPOSES.

THE FIRST PRIZE FOR THE BEST WHEEL PLOUGH FOR LIGHT LAND.

THE FIRST PRIZE FOR THE BEST SWING PLOUGH FOR GENERAL PURPOSES.

THE FIRST PRIZE FOR THE BEST SWING PLOUGH FOR LIGHT LAND.

THE FIRST PRIZE FOR THE BEST SUBSOIL PLOUGH.

THE FIRST PRIZE FOR THE BEST HARROWS FOR GENERAL PURPOSES.

THE SOCIETY ALSO AWARDED TO J. & F. HOWARD

THE SILVER MEDAL FOR THEIR PATENT SAFETY BOILER.

J. & F. HOWARD THUS RECEIVED

TEN FIRST PRIZES AND A SILVER MEDAL,

CARRYING OFF ALMOST EVERY PRIZE FOR WHICH THEY COMPETED,

And this after trials the MOST SEVERE and prolonged ever known.

GREAT EXHIBITION OF ALL NATIONS, 1851.

The Prize Medal for Ploughs and Horse Rakes.

PARIS UNIVERSAL EXHIBITION, 1855.

The Gold Medal of Honour for the Best Ploughs, Best Harrows, and Best Horse Rakes.

PARIS AGRICULTURAL EXHIBITION, 1856.

Seven First Prizes and Eight Gold and Silver Medals, for the Best Ploughs, Best Harrows, and Best Horse Rakes.

AUSTRIAN INTERNATIONAL EXHIBITION, 1857.

The Gold Medal of Honour for the Best Ploughs.

HUNGARIAN INTERNATIONAL EXHIBITION, 1857.

The First Class Diploma for the Best Ploughs.

INTERNATIONAL EXHIBITION, 1862.

The Prize Medal for Ploughs, Harrows, Horse Rakes, Haymakers, and Steam Cultivating Apparatus.

HAMBURGH INTERNATIONAL EXHIBITION, 1863.

The Gold Medal for the Best Ploughs, Best Harrows, and Best Haymakers, and A Prize of Forty Guineas for Steam Cultivating Apparatus.

RUSSIAN INTERNATIONAL EXHIBITION, 1864.

The Large Gold Medal for the Best Plough.

FRENCH INTERNATIONAL STEAM PLOUGHING MATCHES AT ROANNE AND MELUN, 1864.

Both First Prizes of £100 and £60, and both Gold Medals for Steam Cultivating and Ploughing Apparatus.

PRUSSIAN INTERNATIONAL EXHIBITION, 1865.

The Prize Medal for the Best Ploughs and Harrows.

DANISH INTERNATIONAL EXHIBITION, 1866.

The Prize Medal for the Best Ploughs and Horse Rakes.

SWEDISH INTERNATIONAL EXHIBITION, 1868.

The Grand Gold Medal for the best Ploughs, Harrows, Horse Rakes, Haymakers, and Steam Ploughing and Cultivating Apparatus.

PARIS EXHIBITION, 1867.

THE FIRST PLACE WAS GAINED

BY

J. & F. HOWARD,

BRITANNIA IRON WORKS,

BEDFORD, ENGLAND;

THE INTERNATIONAL JURY,

AT THE

GREAT DISTRIBUTION OF PRIZES

IN JULY,

HAVING PLACED THEIR NAMES AT THE

HEAD OF THE PRIZE LIST OF ALL COUNTRIES,

AND ONE OF THE TWO

GRAND PRIZES

GIVEN FOR

ENGLISH AGRICULTURAL MACHINERY,

AT THE CLOSE OF THE EXHIBITION, HAVING
BEEN AWARDED TO THEM.

THESE TWO AWARDS GIVE

J. & F. HOWARD

THE HIGHEST POSITION

GAINED BY ANY MANUFACTURER OF

AGRICULTURAL MACHINERY, EITHER BRITISH OR FOREIGN.

HOWARD'S

PATENT

STEAM CULTIVATING

AND

PLOUGHING APPARATUS.

J. & F. HOWARD have for years been engaged in the manufacture of Steam Cultivating Machinery. They have made and sold some hundreds of Steam Cultivators and Ploughs. For several years they have also cultivated their own farms by steam power, and with so extensive an experience both in using and manufacturing they have of necessity acquired an intimate acquaintance with the subject of Cultivation by Steam.

J. & F. HOWARD now manufacture four kinds of Machinery for Steam Cultivating.

The first consists of two Traction Engines, with a winding barrel to each, working along opposite headlands and drawing a single Plough, Cultivator, or other implement from one Engine to the other alternately.

The second consists of two similar Engines, but each fitted with two winding drums, so that two Ploughs, or two other implements can be drawn simultaneously, and thus both Engines are kept constantly at work.

The third kind is a single Traction Engine precisely the same as the last, and available for the same purposes, with all the necessary anchors, and snatch blocks required for working on what is known as the "roundabout" or stationary principle.

The fourth kind is the apparatus J. & F. HOWARD have made for so many years, consisting of a separate Windlass and tackle, which can be worked by an ordinary Portable or Self-propelling Engine of eight, ten, or twelve-horse power.

The Double Engine system is that which J. & F. HOWARD ordinarily recommend for public companies, very large occupiers, and for persons who purchase machinery to let out for hire; but no invariable rule can be laid down as to which kind is most suitable, so much depending on the district, the size and shape of the fields, and whether the country is excessively hilly or moderately level.

The Single Engine system is far cheaper than the Double, and has been found by some hundreds of practical farmers both thoroughly efficient and economical: for those who purchase machinery simply for the cultivation of a moderate-sized farm, J. & F. HOWARD usually recommend the fourth or last kind described, which has the great merit of running for years without getting out of repair.

As so much depends on the circumstances under which Steam Cultivating machinery has to work, J. & F. HOWARD will be happy to send an experienced person to intending purchasers to inspect their farms and advise them as to the kind of apparatus most suitable.

J. & F. Howard believe the following are established as the advantages of steam power in the cultivation of the soil:—

1. That for the hard work of the farm, steam is a cheaper power than horse power.
2. That deeper and more efficient cultivation is obtained.
3. That it enables the farmer to perform his tillage operations with rapidity and at the best season of the year.
4. That better crops with less manure can be obtained by continuous deep tillage, especially on clays and loams.
5. That the land may be more quickly and effectually cleaned and freed from weeds.
6. That tenacious soils are rendered more friable and porous, good drainage is promoted by stirring the subsoil and breaking the "pan," and open furrows are unnecessary, even on the strongest land.
7. That the Steam Cultivator, Plough, or Harrows may be frequently worked to advantage in an unfavourable season, when to work with horses would be impossible.
8. That not only a considerable diminution in the number of horses employed can be effected, but that the horses which are still necessary can be kept at less expense, being relieved of their most laborious work.

To secure these advantages, the Apparatus should be—

Simple in its construction,
Easily understood and managed by ordinary farm labourers,
Readily adapted to work in any desired position,
Moderate in its first cost, and
Economical in wear.

The great satisfaction expressed by the numerous purchasers of J. & F. Howard's Steam Cultivating Machinery, proves that their efforts to combine these features have been most successful: they do not know a single Farmer who has adopted their Apparatus who would return to horse power for his tillage operations.

The following Judges' reports on Steam Cultivating Machinery have appeared in the *Journal* of the Royal Agricultural Society of England.

LEICESTER MEETING, 1868.

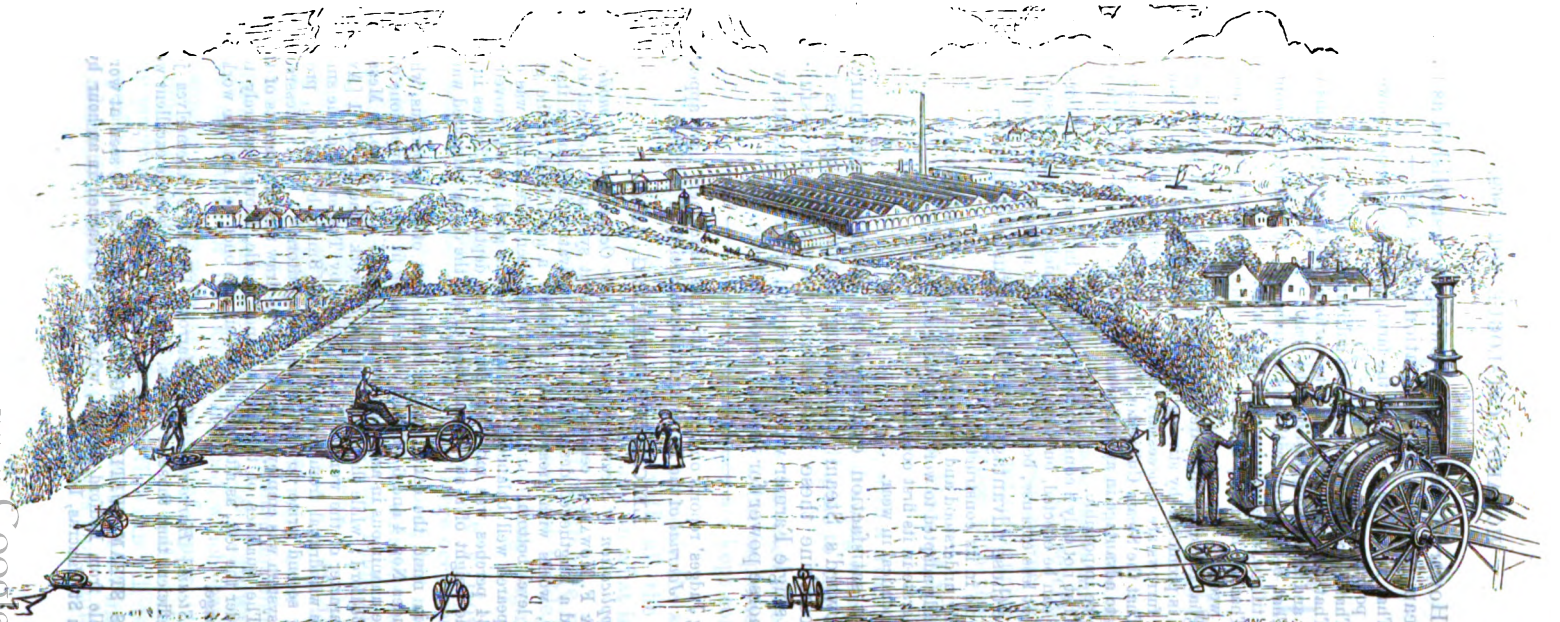
The best application of Steam Power adapted for Occupations of moderate size.—"Messrs. J. & F. Howard's celebrated Roundabout system is too well known to the public to need a lengthened description. The Cultivating implement itself, which is double-acting, works with great steadiness, takes a good hold of the ground, and leaves a very level bottom. . . . The work when once started was continuous; every part appeared well balanced; and the pace was good, as was proved by the fact that 2 acres 34 perches was moved to an average depth of 5¾ inches in 2 hours 14 minutes. The weight of a superficial yard of soil the depth cultivated was 29 stones 10 pounds.

"Bearing in mind the conditions as to the cost of the apparatus, which, in our reading, excludes Nos. 4 and 6 [Fowler] from being fit for "occupations of moderate size," we were unanimous in awarding the first prize of £50 to No. 2, Messrs. J. & F. Howard, of Bedford; while the small amount of work done by No. 1 [Aveling], the indifferent character of the work of No. 3 [Smith, by Tasker], and the small amount of it, and the withdrawal from the trial of No. 5 [Smith, by Hayes], prevented our awarding the second prize to any of the competitors. . . . Messrs. Howard's Roundabout system was employed throughout to draw the implements of the various exhibitors. The qualities of the Engine and Tackle, though severely tested, were successful under the test, as after the apparatus was once well set, the work proceeded without stoppage."

Class of [Steam] Harrows.—"The Harrows [Fowler's] themselves jump more and are less efficient than those of Messrs. Howard, which made excellent work."

HOWARD'S STEAM CULTIVATING APPARATUS can be seen at work on their farms, one mile from Bedford Station, which can be reached in an hour by Midland Railway from St. Pancras, London.

HOWARD'S STEAM CULTIVATING APPARATUS ON THE SINGLE ENGINE SYSTEM.

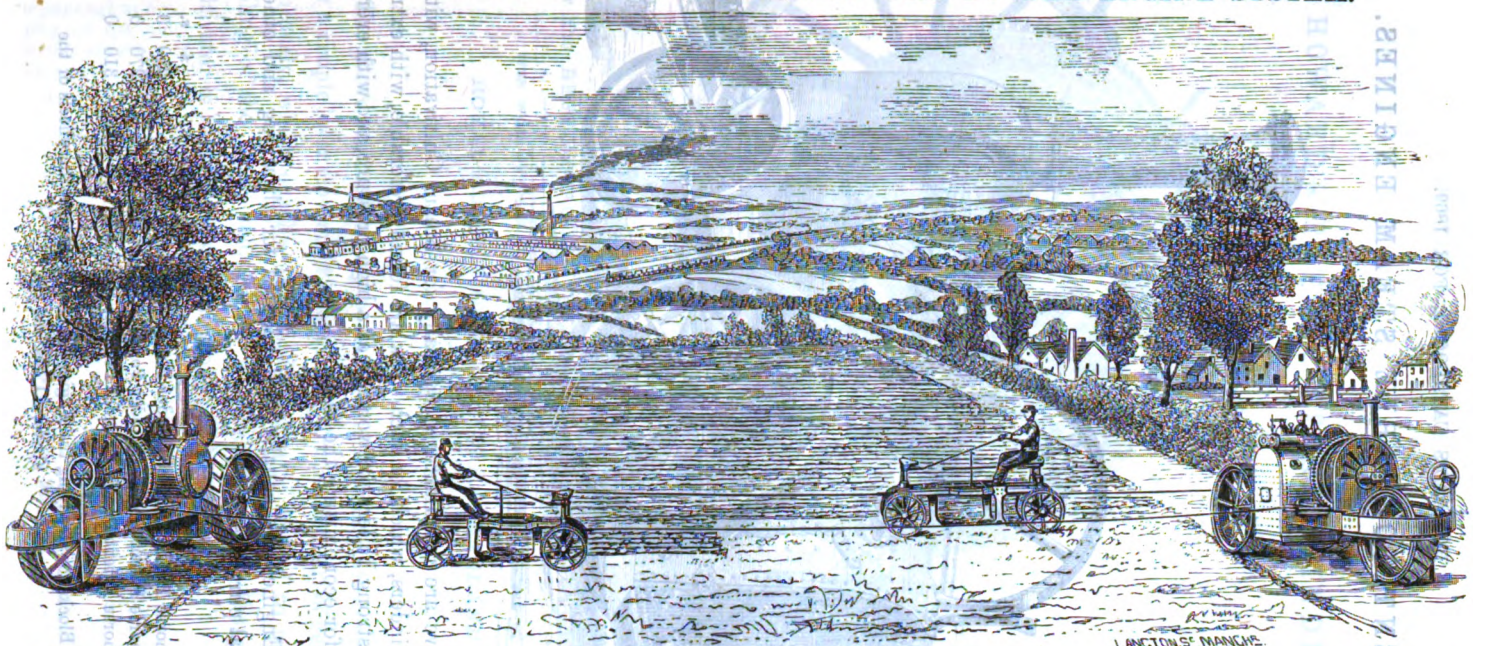


The First and only Prize for the best application of steam power adapted to farms of moderate size, was gained by this apparatus at the last Great Trials of the Royal Agricultural Society of England, held at Leicester, 1868.

This system is adapted for the cultivation of a moderate sized farm, and has the great merit of running for years without getting out of repair.

For Price, see page 20.

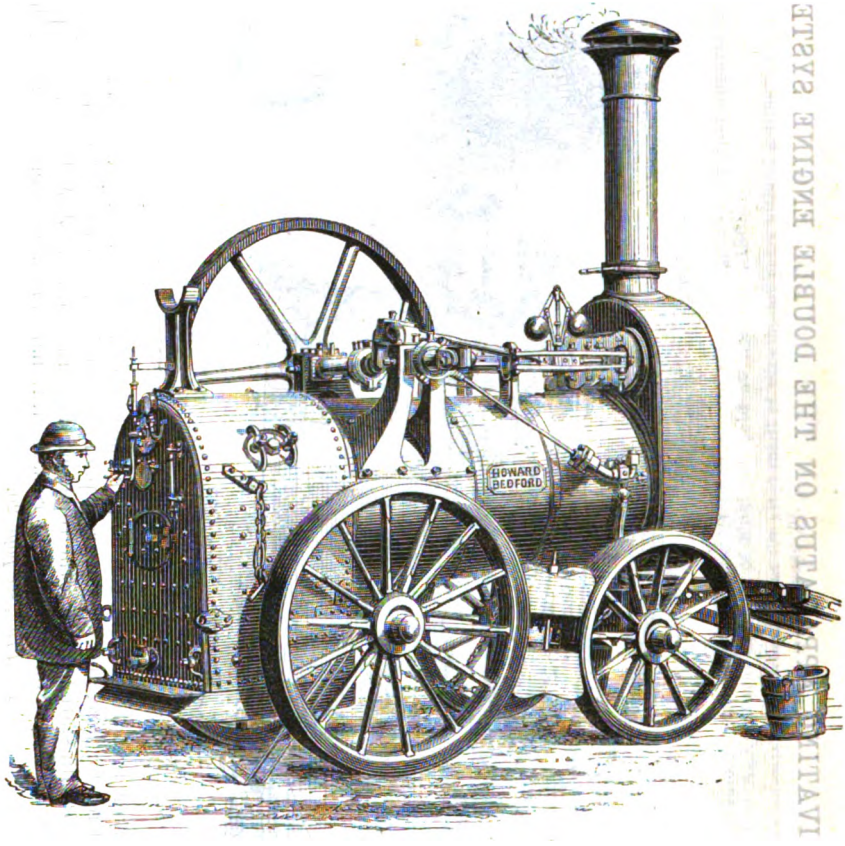
HOWARD'S STEAM CULTIVATING APPARATUS ON THE DOUBLE ENGINE SYSTEM.



This system requires less rope, and a greater breadth of land can be ploughed in a day than by any other arrangement. It is specially adapted for large occupations, letting for hire, and for the great plains of foreign countries. In very hilly districts and awkwardly-shaped fields, both engines may remain stationary, and the ropes can be arranged as in J. & F. Howard's plan of working the ordinary portable engines and fixed windlass; or one engine may remain stationary and the other move along the headland.

For Price, see page 20.

PATENT PORTABLE STEAM ENGINES.



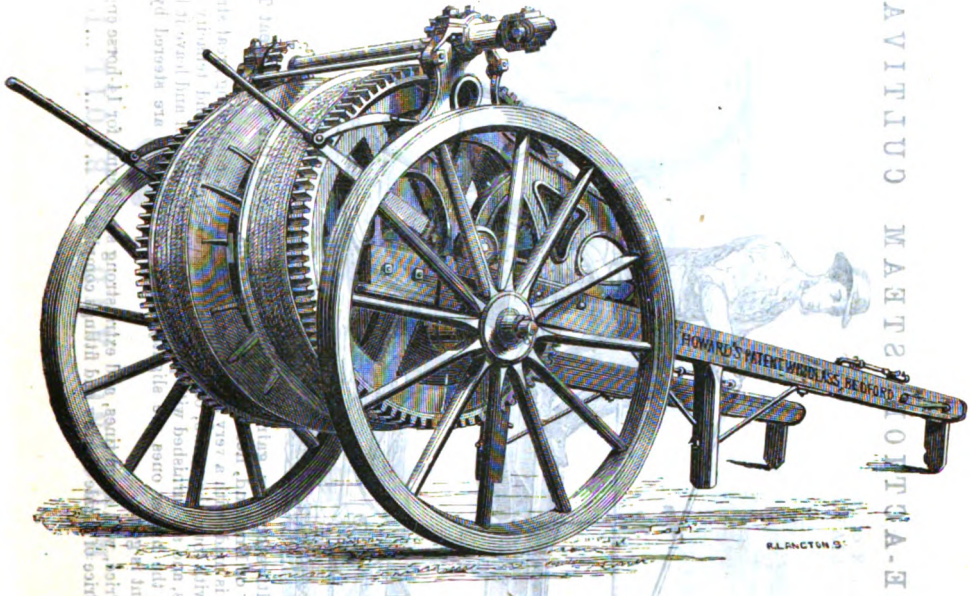
The above are manufactured specially for Steam Cultivation, with double cylinders, which for such work are found preferable, with extra large and strong boilers for working at a high pressure, and with every appliance for economizing the fuel.

These Engines are equally well adapted for thrashing and other agricultural purposes.

	£	s.	d.
Price of 8-horse Patent Double Cylinder Portable Engine	250	0	0
Price of 10-horse Patent Double Cylinder Portable Engine	270	0	0
Price of 12-horse Patent Double Cylinder Portable Engine	310	0	0

Screw Blocks for steadying the Engine, as shown between the wheels of the above, £1 10*s.* the set.

HOWARD'S PATENT STEAM WINDLASS.



THE FIRST AND ONLY PRIZE

for the BEST DETACHED WINDLASS for STEAM CULTIVATION

was won by J. & F. Howard at the last Great Trials of the

ROYAL AGRICULTURAL SOCIETY of ENGLAND,

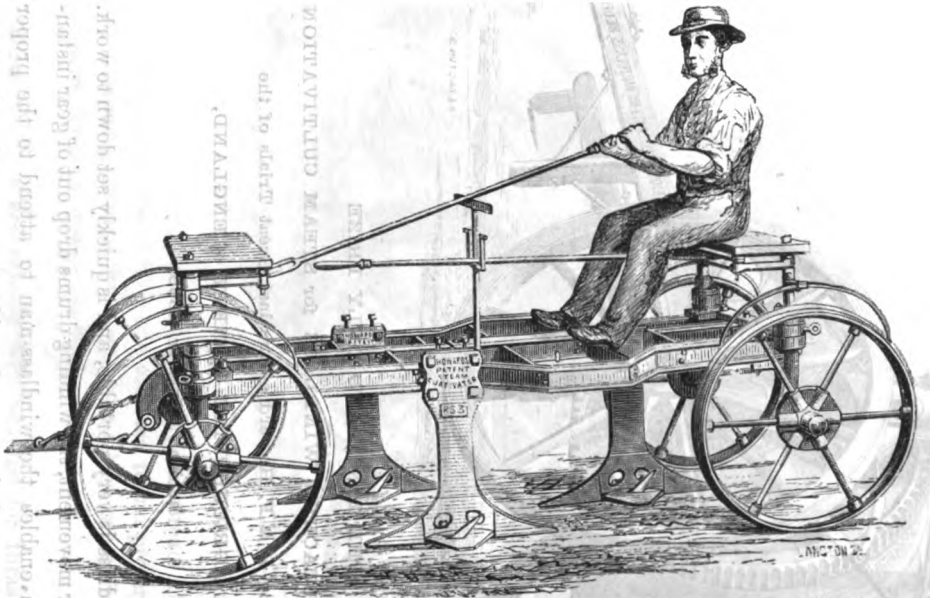
held at Leicester, 1868.

The above windlass is very portable, and is quickly set down to work. By a simple lever movement, the winding drums drop out of gear instantaneously, which enables the windlass-man to attend to the proper coiling of the rope; and, in case of accident, to stop the plough or cultivator in an instant, without stopping the engine.

Price £70 0 0

(*For Price of Ropes, see page* 21.)

HOWARD'S PATENT DOUBLE-ACTION STEAM CULTIVATOR.

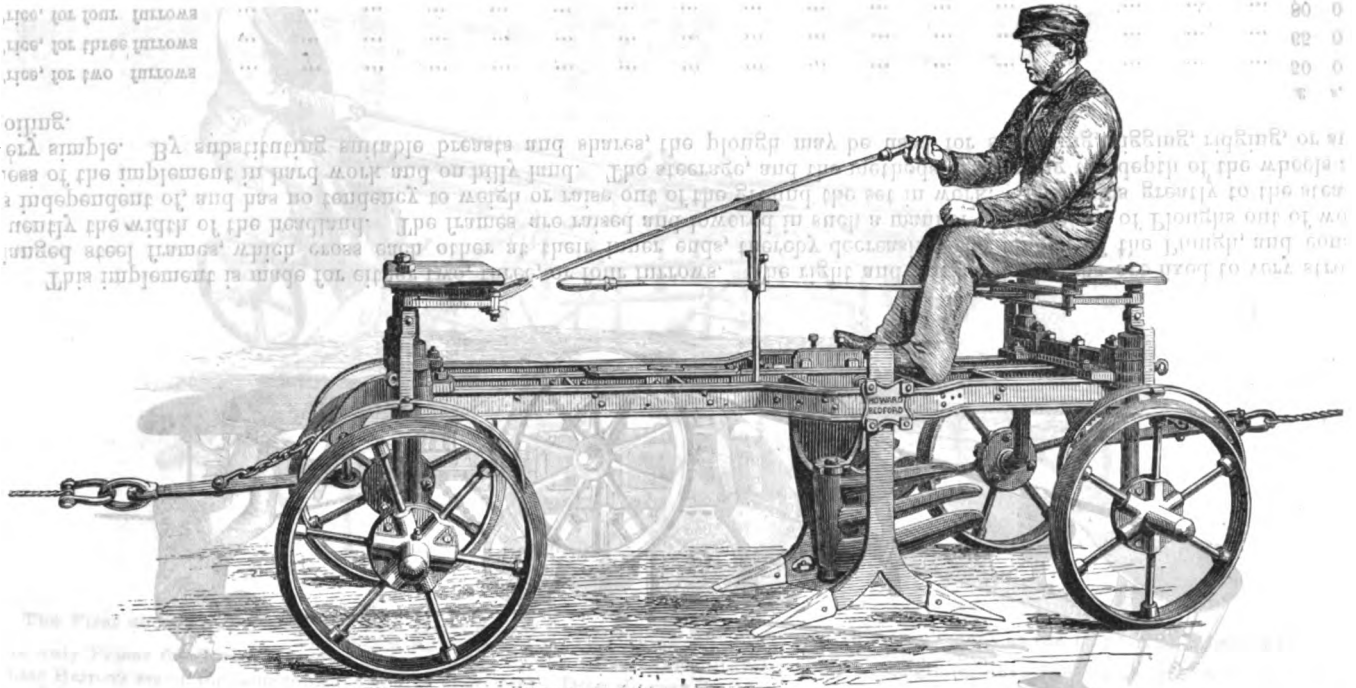


The First and only Prize for the best Five-tined Steam Cultivator was gained by this Implement at the last Great Trials of the Royal Agricultural Society of England, held at Leicester, 1868.

This Implement, which effectually cuts up the land at one operation, is made with a very strong flanged steel frame, combining great strength with comparatively little weight. It is fitted with five tines, but can be used with four, three, two, or one, according to the depth and tenacity of the soil. The shares are made of various widths, from two inches up to thirteen inches, and are furnished with prongs, which lift up the soil and leave it loose. The tines rock on the frame, so that as the points in the work are depressed, the hinder ones are slightly raised. The wheels are steered by the ploughman alternately at each end, according to the direction in which the implement is going.

Price, with three tines	...	...	...	...	£21	0	0	Price, with seven tines, and extra strong steel beams for 14-horse engine			£45	0	0
Price, with five tines	...	...	...	...	25	0	0	Price of a Side Harrow and fittings complete	...	...	...	...	8	10	0

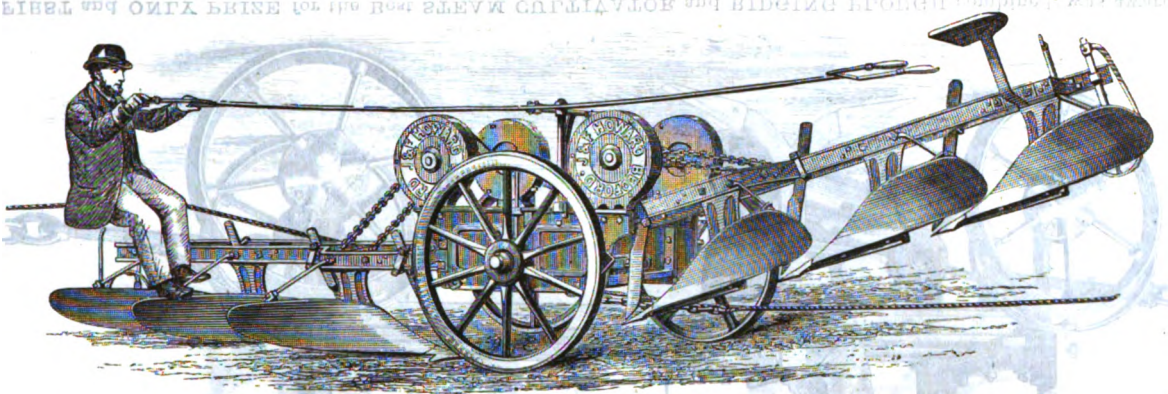
HOWARD'S COMBINED STEAM RIDGING AND SUBSOIL PLOUGH.



The FIRST and ONLY PRIZE for the Best STEAM CULTIVATOR and RIDGING PLOUGH combined, was awarded to J. and F. Howard, at the Newcastle Meeting of the Royal Agricultural Society of England.

	£	s.	d.
Price, as above	21	0	0

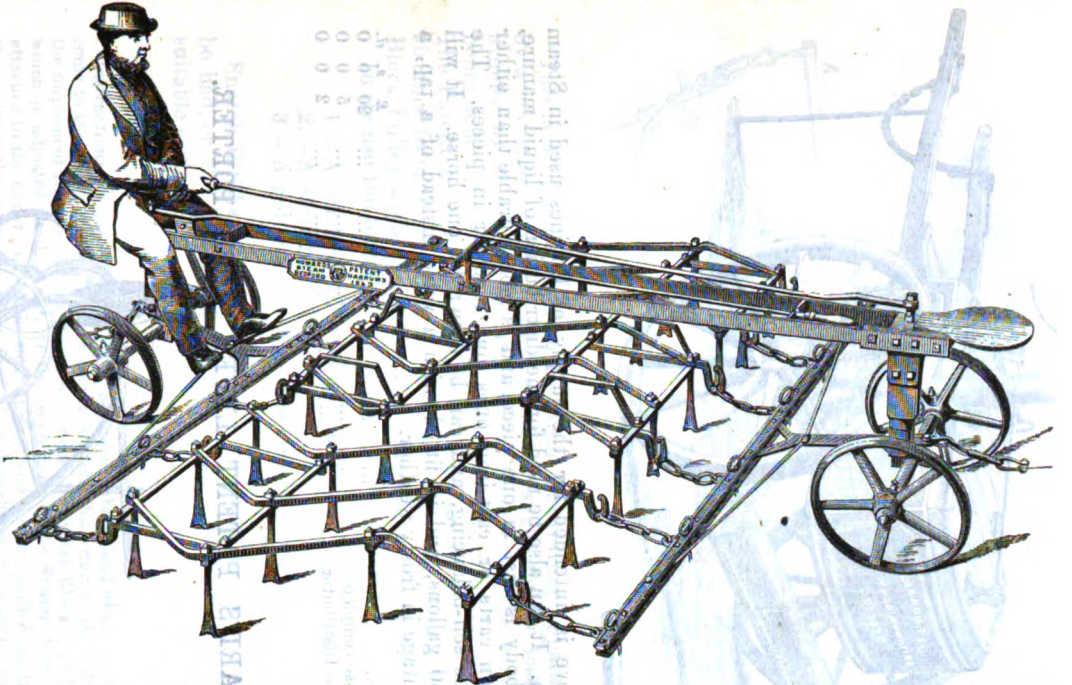
HOWARD'S PATENT DOUBLE-ACTION STEAM PLOUGH.



This implement is made for either two, three, or four furrows. The right and left hand Ploughs are fixed to very strong flanged steel frames, which cross each other at their inner ends, thereby decreasing the length of the Plough, and consequently the width of the headland. The frames are raised and lowered in such a manner that the set of Ploughs out of work is independent of, and has no tendency to weigh or raise out of the ground the set in work. This adds greatly to the steadiness of the implement in hard work and on hilly land. The steerage, and the methods of altering the depth of the wheels are very simple. By substituting suitable breasts and shares, the plough may be used for scarifying, digging, ridging, or subsoiling.

	£	s.	d.
Price, for two furrows	50	0	0
Price, for three furrows	65	0	0
Price, for four furrows	80	0	0

HOWARD'S PATENT STEAM DRAG HARROWS.



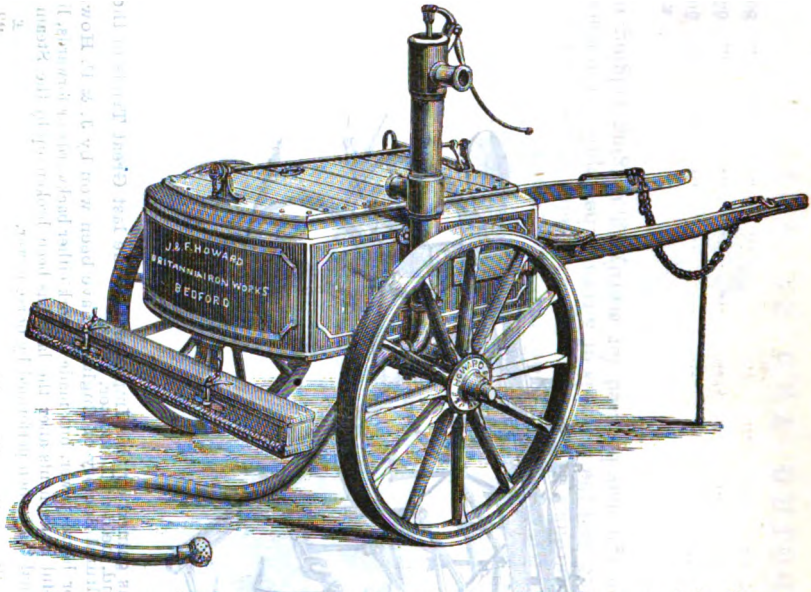
The First and only Prize for the best Harrows for Steam Power was gained by this Implement at the last Great Trials of the Royal Agricultural Society of England, held at Leicester, 1868.

The only Prizes for Steam Harrows ever awarded by the Royal Agricultural Society of England, have been won by J. & F. Howard.

These Harrows are on the same principle as J. & F. Howard's Drag Harrows for horse power, but made to work either backwards or forwards, like the Steam Cultivator, the attendant steering them in like manner. They are most useful implements after the land has been broken up by the Steam Cultivator, and 15 to 20 acres a day may be done with them, and the work is more effectual than when performed by horse power.

	£	s.	d.
Price of extra strong set, marked No. 1	22	10	0
Price of lighter set, marked No. 2	20	0	0

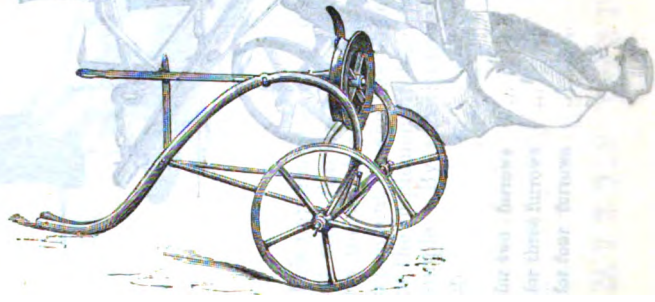
HOWARD'S IMPROVED IRON WATER CART.



The above is intended for the supply of Engines used in Steam Cultivation. It can also be used for the distribution of liquid manure, &c. The body is cast in one piece, and is more durable than either wrought-iron carts or cast-iron ones put together in pieces. The above cart is self-balancing, and can be drawn by one horse. It will contain 180 gallons, and is fitted with a valve instead of a tap, a great advantage in frosty weather.

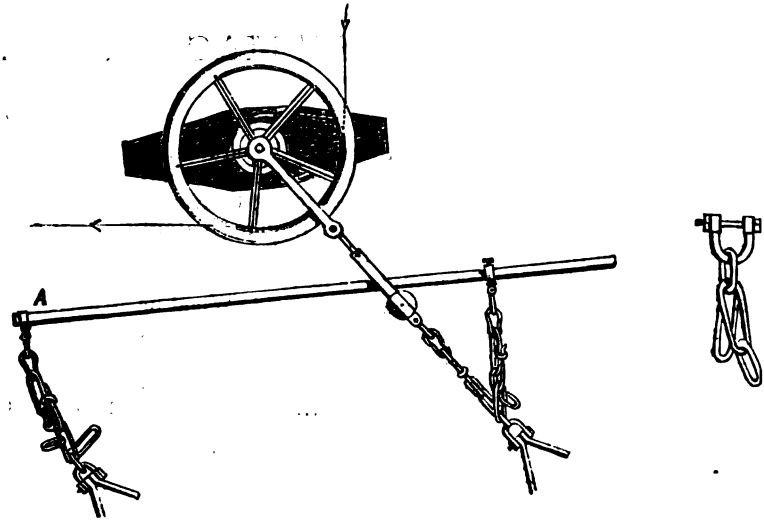
	£	s.	d.
Price	20	0	0
Pump and Hose complete	5	0	0
Liquid Manure Distributor	2	0	0

HOWARD'S PATENT LEVER ROPE PORTER.



	£	s.	d.
Price	1	10	0
Price of Three Wheel Porters...	1	15	0

BULSTRODE'S PATENT SNATCH BLOCK SLING.



This is a valuable addition to Steam Cultivating Apparatus worked by a stationary engine. By a simple arrangement the loss of time is avoided which takes place at the headlands while the snatch block is being detached from the anchor, and moved forward for the next bout. The Patent Snatch Block Sling enables the anchor-man, without assistance from the ploughman, to detach and move forward the Snatch Block Pulley while the implement is traversing the field.

In its use the following advantages are obtained:—

1.—A considerable saving in time.
2.—A saving of labour.
3.—A reduction in the total cost of the work done.

Snatch Blocks specially adapted to work with the patent slings can be had, or the Snatch Blocks now in use can readily be mounted on suitable sledges.

Instructions for use.—Set the Sling as shown above, and when the implement has come to the end of the bout, knock off the Snatch Block ring in the ordinary way. As the implement returns, the slack rope will cause the Snatch Block to slide to the stop A, which is adjusted to the width of the implement. The Snatch Block must then be attached to the under link of the next anchor, and the bar shifted for the next bout to the position shown in the engraving. The draught of the hauling rope must never depend upon the sliding bar, the tube not being intended to take any of the strain.

	£	s.	d.
Price of a pair of Patent Snatch Block Slings, complete	10	0	0
Price of a pair of Snatch Blocks, fitted with sledges to work with the above	6	10	0

PRICES OF SETS OF

HOWARD'S PATENT

STEAM CULTIVATING MACHINERY.

	£	s.	d.
Price of a set of 10-horse Steam Cultivating Apparatus, to work on the Stationary system, with the Patent Windlass, 1600 yards of Patent Steel Wire Rope, Universal Joint, for connecting the Windlass with Engine; Patent Double-action Steam Cultivator, with five tines; Patent Double Snatch Block, with arrangement for slack rope; 5 Single Snatch Blocks, 7 Iron Anchors, 4 Wood or Dead Anchors, 21 Rope Porters, 2 Anchor Couplings, 2 Beetles, 3 Wood Levers, 2 Crowbars, 1 Connecting Chain, and 1 Rope Coiler, being everything required, except Engine	250	0	0
Price of a 12-horse Patent Ploughing and Traction Engine with two Winding Drums, 1600 yards of Patent Steel Wire Rope, double-action Steam Cultivator with five tines, all necessary Anchors, Snatch Blocks, Rope Porters, &c., for working on the stationary principle ...	800	0	0
Price of a pair of 10-horse Patent Ploughing and Traction Engines, each with Single Winding Drum, constructed to work on the Double Engine System, with 800 yards of Patent Steel Wire Rope, double-action Steam Cultivator with five tines, and six Rope Porters	1180	0	0
Price of a pair of 12-horse Patent Ploughing and Traction Engines, each with Single Winding Drum, constructed to work on the Double Engine System, with 800 yards of Patent Steel Wire Rope, double-action Steam Cultivator with five tines, and six Rope Porters	1300	0	0
Price of a pair of 10-horse Patent Ploughing and Traction Engines, each with two Winding Drums, constructed to work on the Double Engine System, with two Cultivators working simultaneously, 1600 yards of Patent Steel Wire Rope, and twelve Patent Lever Rope Porters ...	1260	0	0
Price of a pair of 12-horse Patent Ploughing and Traction Engines, each with two Winding Drums, constructed to work on the Double Engine System, with two Cultivators working simultaneously, 1600 yards of Patent Steel Wire Rope, and twelve Patent Lever Rope Porters ...	1400	0	0

J. & F. Howard do not pay the carriage of Steam Cultivating Apparatus, but they allow 2½ per cent. discount for cash in a month from date of Invoice. Having special arrangements with the different Railway Companies to forward the Apparatus at greatly reduced through rates to almost every station in Great Britain, the above discount will, in many cases, cover the cost of carriage.

PRICES OF FITTINGS FOR STEAM CULTIVATING APPARATUS.

		£	s.	d.
Malleable tines for cultivator, marked R S 3	each	1	10	0
Ridging body for cultivator, marked R S R	„	3	0	0
Patent wheels for cultivator, 22-inch, marked S C 20 ...	„	0	12	6
Patent wheels for cultivator, 32-inch, marked S C 30 ...	„	1	5	0
Patent wheels for cultivator, 25-inch, marked S C N 25	„	1	0	0
Wrought standard and axle, complete, for cultivator wheels	„	0	10	0
Malleable clips for cultivator, with fittings complete, per pair		0	10	6
Wrenches for cultivator (single end)	each	0	1	6
Wrenches for cultivator (treble end)	„	0	3	6
Wrought-iron anchors	„	2	7	6
Wood anchors	„	0	17	6
Snatch blocks, complete	„	2	10	0
Pulleys for snatch blocks	„	1	0	0
Angle iron rope porters	„	0	10	6
Bushes for angle iron rope porters	„	0	0	3
Rollers for angle iron rope porters	„	0	3	0
Pulleys for three-wheel rope porters	„	0	2	6
Pulleys for two-wheel rope porters	„	0	3	0
Rope coilers	„	0	7	6
Beetles	„	0	3	6
Wood levers	„	0	5	0
Crowbars	„	0	5	0
Signal whistles	„	0	1	6
Eyes for steel wire rope	„	0	2	6

PRICES OF BEST PATENT STEEL WIRE ROPE.

	£	s.	d.
1¼ inch in circumference, per 100 yards	4	7	6
2 inches in circumference, per 100 yards	5	15	0
2¼ inches in circumference, per 100 yards	6	7	6

INSTRUCTIONS FOR WORKING HOWARD'S PATENT STEAM CULTIVATING APPARATUS ON THE SINGLE ENGINE SYSTEM.

TO THE ENGINE DRIVER.

1.—Be sure that the engine stands firmly, and as nearly level as possible.

2.—Whenever you can, set down the engine on the highest part of the field.

3.—Look very often at the ploughmen and anchor-men.

4.—Slacken speed before the implement gets to the end of the land.

TO THE WINDLASS-MAN.

1.—Fix the windlass so that the driving shaft shall be as nearly level with the fly-wheel shaft of the engine as possible.

2.—Place the double snatch block about 12 yards before the windlass. The middle should be exactly in a straight line with the middle of the windlass.

3.—Do not put the drums into and out of gear while the windlass is in motion, except in cases of necessity, and keep the drum shaft well oiled.

4.—Before the engine starts, pull the rope tight on the drum, and hold it so until the slack is all wound up.

5.—If an anchor pulls up, let out a little slack rope at once.

6.—Screw up the bearings occasionally, and keep all well oiled with the *best sperm oil.*

7.—The rope must be wound tight on the drum before work is commenced.

TO THE ANCHOR-MAN.

1.—Lay your anchor in such a position that the strain is equal on both legs.

2.—When the plough is working away from you, let your anchor well into the ground, so that it may get a good hold before the strain of the engine comes on to it.

3.—If you find the engine driver is not stopping the plough in time, knock off the snatch-block ring directly, so as to prevent the plough running into the anchor.

TO THE PLOUGHMAN.

1.—Look round the plough at dinner-time and each night, to see that all is tight and in working order; keep by you some extra washers, linch-pins, wheels, and shares.

2.—When the ground is very hard, use narrow shares for breaking up.

3.—See that the wheels are *well oiled* daily. Take them off weekly, and well scrape and clean both axles and wheels. Be careful that the swivels turn freely.

MANAGEMENT OF THE ROPE PORTERS.

1.—Use the two-wheeled porters in the track of the implement, 30 yards apart, and work them by two boys, one to pull them out, and the other to replace them.

2.—Place the three-wheeled porters about 50 yards apart.

SIGNALLING.

The best mode of signalling is for the ploughman to hold up the flag when about ten yards from the end of the land; the engine driver should then slacken speed. The flag should not be dropped until the end is reached. In foggy weather each man should use a signal whistle.

SPECIAL INSTRUCTIONS FOR WORKING HOWARD'S STEAM TRACTION & PLOUGHING ENGINES.

1.—The best sperm oil or refined lard oil only must be used. Bad oil is a great cause of wear and tear, and its use often results in expensive breakages.

2.—Never start the engine with the reversing link, but with the regulator.

3.—Do not back the engine and then run at the work full speed. If this is done, the probability is that something will give way or be strained.

4.—Do not move the engines in the fields when the ground is very wet and soft.

5.—The grappling irons, for occasional use on the wheels, are intended for soft land, and are not to be used on *planks* or a *hard road.*

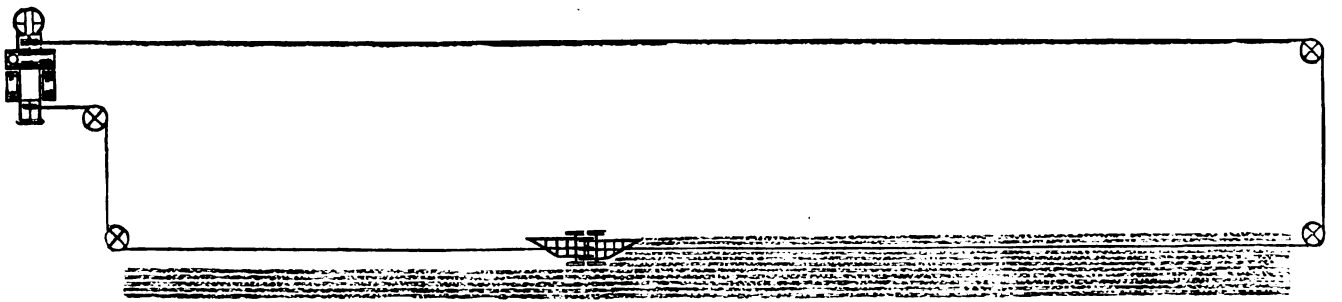
6.—If the engine unavoidably sinks into a hole, first jack up the wheels and put planks under, and then haul it out by the rope and pulley on the main axle.

7.—If the lead plug on the crown of the fire-box leaks, or is accidentally melted, replace it by another *lead* one.

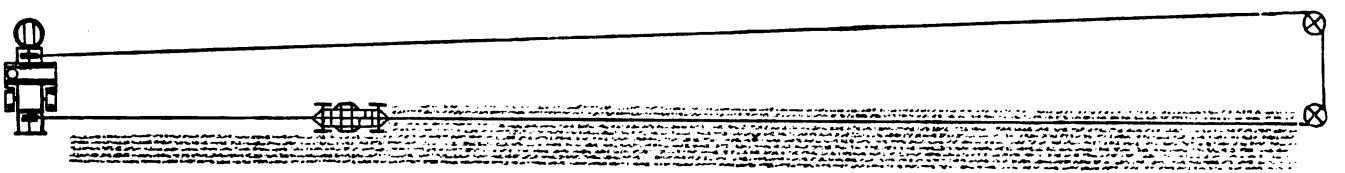
8.—The mud-hole lids should be taken out once a week, and the boiler well washed and cleaned out; but the water must not all be blown off when the steam is up, as it causes the tubes and rivets of the boiler to leak.

It is of the greatest importance that the above Instructions should be strictly attended to, and that every part of the Engine should be kept clean and well oiled. Attention to these points will greatly add to its durability and efficiency.

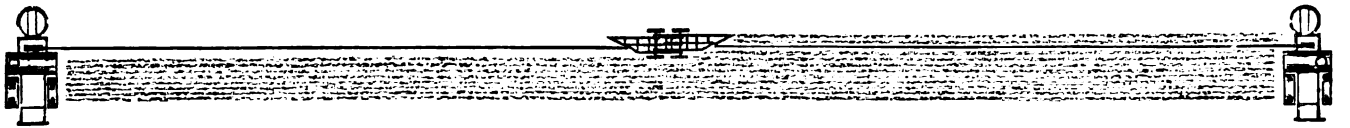
PLANS OF WORKING THE CULTIVATING APPARATUS WITH TRACTION ENGINES.



This Plan, in which the Engine is stationary, has all the peculiar advantages of J. & F. Howard's well-known apparatus on the Single Engine System.



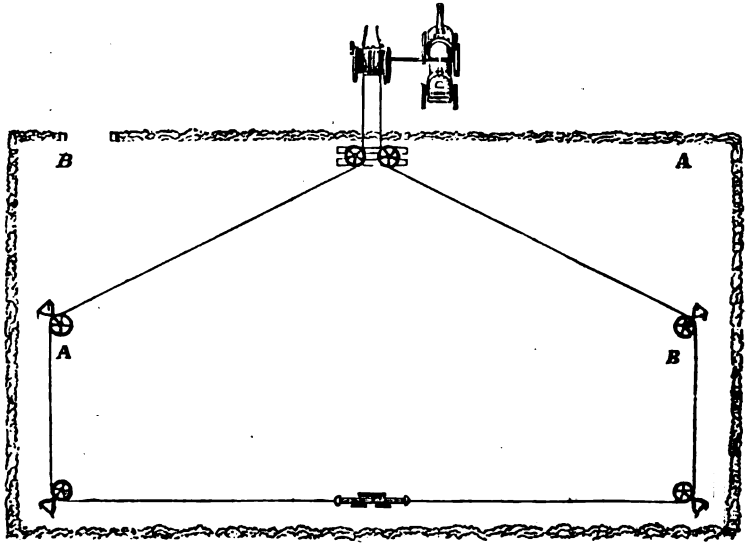
In this plan, the Traction Engine moves along the headland with a corresponding moveable anchorage on the opposite headland; and it requires less rope and one anchor-man less than the above plan. This arrangement is an advantageous one with square fields, and when the weather is favourable enough to allow of the Engine travelling on the road or headland.



In this plan, a pair of the Traction Engines work along opposite headlands, with one plough or cultivator between them, using either the front or back drum of either Engine. This plan is a useful one to adopt, to avoid loss of time in case of anything happening to prevent the use of either drum, when working on the plan shown below.

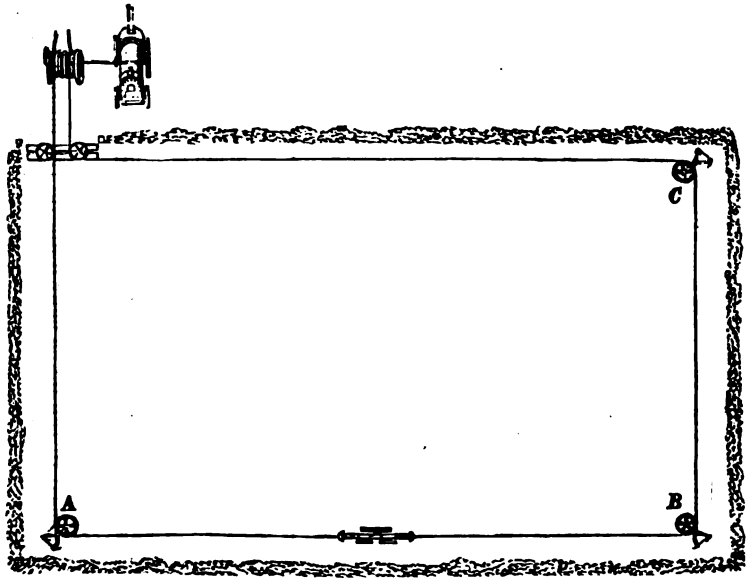
This shows a pair of Traction Engines moving on opposite headlands, with two implements worked simultaneously between them. A larger quantity of work can be done by this plan than by any other. As these Engines are, in all respects, similar to those used in the plans shown above, the possession of a pair of them gives the great advantage of being able to work on whichever system is best adapted to the work in hand, without change of Apparatus.

PLANS FOR SETTING DOWN THE CULTIVATING APPARATUS ON THE SINGLE ENGINE SYSTEM.



Fix the Engine in an adjoining field or road, and pass the ropes through the fence or a gateway. When the Cultivator has worked as far as A B, remove the pulleys to the corners marked B A.

PLAN TO COMPLETE A FIELD WITHOUT MOVING THE ROPES.



In this plan the implement may be worked either between A and B, or between B and C.

LIST OF PURCHASERS IN GREAT BRITAIN

OF

STEAM CULTIVATING IMPLEMENTS,

MANUFACTURED BY

J. & F. HOWARD.

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Mr. B. Bomford, Pitchill, Evesham
Mr. H. Allsopp, Hindlip Hall, Worcester
Mr. John Higginbottom, Pensax Court, Tenbury [Broadway
Mr. W. Hiorns, Church Honeybourne,
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Rt. Hon. Earl of Caithness, Barrogill Castle, Thurso
Rt. Hon. Lord Kinnaird, Rossie Priory, Inchture
Colonel Hay, Dunse Castle, Dunse
Mr. H. Houldsworth, Coltness, Motherwell
Mr. G. Hope, Fenton Barns, Drem

Ireland.

Right Hon. Lord Longford, Killucan
Mr. T. C. Trench, Millicent, Naas
Mr. J. N. S. Wallis, Drishane Castle. Millstreet
Mr. W. Malcomson, Tramore
Mr. E. Purdon, Chantilly, Loughlinstown

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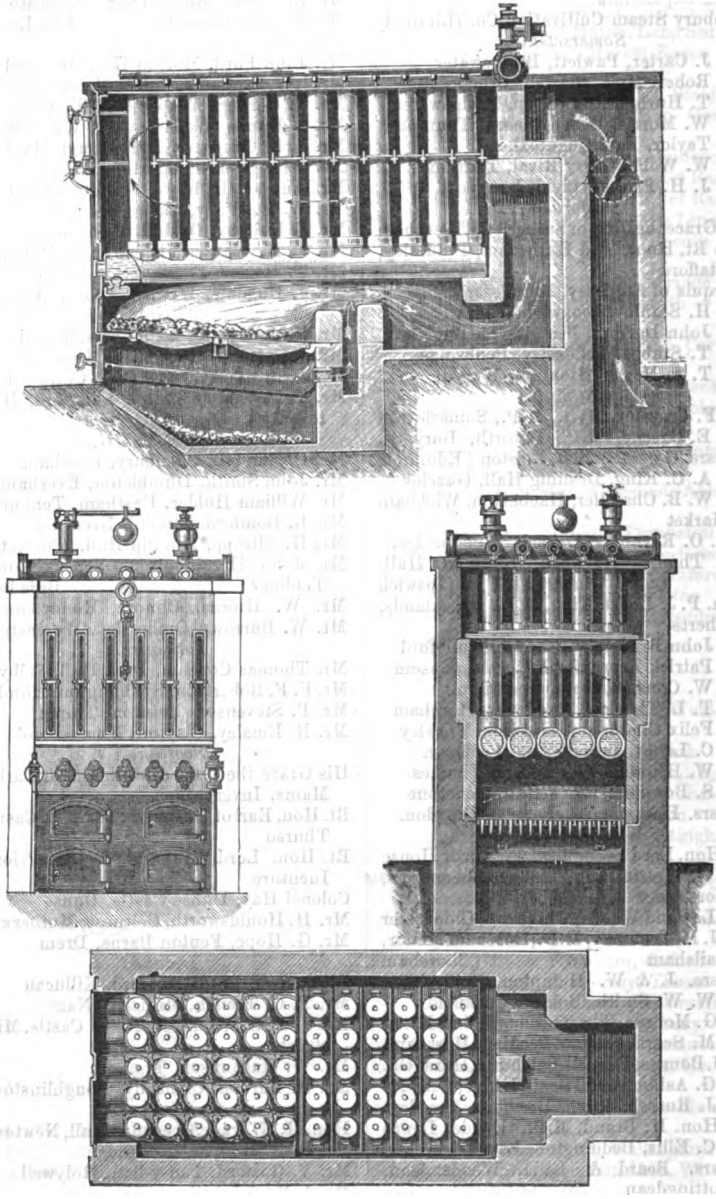
Hon. H. H. Tracy, Gregynog Hall, Newtown
Mr. R. N. Hooper, Cowbridge
Mr. V. Gosford, Tan-y-llan, Holywell
Mr. J. Surridge, Cogan Hall, Cardiff

In addition to the above, J. & F. HOWARD have supplied large quantities of STEAM CULTIVATING MACHINERY to France, Belgium, Germany, Sweden, Italy, Spain, Portugal, Greece, Turkey, Egypt, India, America, West Indies, Australia, New Zealand, and other parts of the world.

HOWARD'S

NEW PATENT

SAFETY BOILERS.



MANY ARE NOW AT WORK IN LONDON, BIRMINGHAM, LIVERPOOL, MANCHESTER, AND VARIOUS OTHER PARTS OF ENGLAND, AS WELL AS ABROAD.

HOWARD'S NEW PATENT SAFETY BOILER AND SUPERHEATER.

J. & F. HOWARD have had their attention drawn to the subject of the construction of Steam Boilers by three primary considerations.

1. The frequent loss of life and great destruction of property attending boiler explosions, the recurrence of which, with the ordinary type of boiler in use, neither expense nor precaution on the part of the owners can altogether prevent.

2. The difficulty, loss of time, and expense of repairing the ordinary Cornish boilers in use at their own Works.

3. The desirability and economy of using superheated steam at high pressure.

After many preliminary experiments conducted with much care, in January, 1866, J. & F. HOWARD constructed a boiler of 40-horse power for their own Works upon a somewhat novel arrangement. Subsequently another of the same size was fixed; the two replacing Cornish boilers formerly in use. The results of their working have been so satisfactory that it is with the utmost confidence they direct public attention to their new "Patent Safety Boiler and Superheater."

The following are some of the objections to tubulous or water tube boilers; those combining water tubes with the shell and flues of ordinary boilers not only retain the disadvantages above named, but they are also more complicated; in others, machinery is used to produce a forced circulation of the water, and in some there is such a defective circulation of the water as to destroy the tubes by fouling.

From these defects J. & F. HOWARD'S new Patent Safety Boiler is entirely free, and among its advantages the following may be enumerated:—

Safety: No Risk from Explosion.

The new Boiler is built up of wrought-iron tubes, the bursting pressure of each of which is at least 2,000 pounds per square inch, and the whole of the steam pipes and connections are tested to a pressure of 500 pounds. In the very unlikely event of the bursting of a single tube, NO DANGEROUS ACCIDENT COULD ENSUE. The result would only be equal to the opening of a valve, with a rush of steam and water into the heating chamber, a sudden lowering of the steam pressure, and possibly the extinction of the fire.

The new Boiler has less area of water surface per horse power than the Cornish boiler, but this smaller area is fully compensated for by increased length of water range, which is more than three times that of ordinary boilers, and any irregularity in the supply of feed water is more readily detected.

Economy of Fuel, and Consumption of Smoke.

In getting up steam to the working pressure, much less coal is required than is consumed by the ordinary Cornish boiler. The heat is readily absorbed by the tubes, and the highest amount of evaporation is obtained; a Gauntlett's pyrometer, placed in the flue leading to the chimney, indicates the temperature of the escaping gases at nearly the same heat as that of the Steam in the Boiler. The current of heated gases impinges on the surface of the vertical tubes at right angles, instead of simply gliding underneath as in the ordinary Cornish and tubular boilers. The relative value in the two kinds of heating surface has been set forth by an eminent Engineer in these words:—"The effect produced by the direction in which the heated current strikes the surface may aptly be compared to the rolling of a cannon ball rapidly along a sheet of ice, as compared with letting it fall vertically on its surface." By a simple contrivance, which is peculiarly applicable to this description of Boiler, the Smoke may be effectually consumed.

High Pressure Superheated Steam.

Engineers seem pretty well agreed that much may be done to reduce the cost of steam power by using high pressure superheated steam. The new Patent Boiler and Superheater is exactly adapted for this purpose. The upper parts of the tubes forming the steam space or reservoir, being exposed to the radiated heat of the heating chamber, and the current of heated gases which have already passed among the tubes containing the water, the steam may be superheated to any desired degree.

Circulation of the Water.

This is so perfect throughout the boiler that no burning out or fouling of the tubes takes place. Each tube has within it an internal one rising up through the water space, dividing the water into annular and central columns. The current of heated gases impinging upon the tubes, causes the water in the outer spaces to rise to the top and flow down to the bottom of the inner tubes; in consequence, a most active circulation is kept up in every part of the boiler.

J. & F. HOWARD are convinced that water containing a large per centage of lime, or other earthy or saline matters, may be used in the new boilers without inconvenience or danger. The number of instances in which the boilers are working successfully with water containing an unusually large proportion of lime, warrants J. & F. HOWARD in coming to this conclusion.

Simplicity of Parts, Facility of Repairs, and Durability.

In this new Boiler and Superheater, NO BOLT OR JOINT IS EXPOSED TO THE ACTION OF THE FIRE, AND IT HAS NO RIVETS OR SEAMS IN ITS CONSTRUCTION. Every part being made on the interchangeable principle, the repairs can be done by any ordinary fitter. The tubes being counterparts of each other, any of them may be brought in succession to that part of the boiler where the heat is most intense, thus greatly increasing their durability. The tubes are so arranged and fitted in sections that each is free to expand and contract; the variable expansion and contraction, therefore, to which they are subjected in the heating chamber, produces no injurious effect.

Portability, Economy of Space, and Facility in Setting.

Three men are sufficient to move and fix the boiler in almost any position, and the largest piece will pass through a common doorway. It can be packed in a very small compass for exportation, and can be transported on bad roads, through mountainous districts, or on backs of camels. The space occupied by the new boiler when fixed is little more than half that required for a Cornish boiler of the same power, and although the most convenient shape is a parallelogram, it may be adapted to almost any position. The brickwork setting is plain; where there is only one boiler it is set between two straight walls; but where there are two or more boilers, a straight dividing wall is all that is required in addition.

Howard's Patent Safety Boilers are in constant use for the following purposes:—

Breweries	Forage Works	Paper Mills
Brickworks	Foundries	Printing Works
Carpet Factories	Gas Works	Saw Mills
Chemical Works	Indigo Works	Silk Mills
Cotton Factories	Iron Works	Sugar Mills
Farm Machinery	Manure Works	Tanneries
Flour Mills	Oil Mills	Warehouses, &c.

Intending purchasers can be referred to many in various parts of the kingdom who are using these Boilers with great advantage.

In addition to the above, J. & F. Howard have exported many of their Patent Safety Boilers to France, Italy, Russia, North and South America, Asia Minor, India, China, South Africa, Mauritius, New Zealand, and other parts of the world.

Howard's Patent Safety Boilers can be seen at work, and tubes taken from them for examination, on application to J. & F. HOWARD, Britannia Iron Works, Bedford.

A complete Model and a specimen set of TUBES can also be seen at J. & F. HOWARD'S LONDON OFFICE, 4, CHEAPSIDE, E.C., three doors from St. Paul's.

SOME OF THE ADVANTAGES OF

HOWARD'S PATENT SAFETY BOILERS.

Safety: No Risk from Explosion.
Economy of Fuel and Consumption of Smoke.
No Seams or Rivets.
Saving of Cost and Time in Repairs.
Portability.
Can be fixed in places inaccessible to Cornish Boilers.
High Pressure and Dry Steam with perfect Safety.
No Leaky Joints.
Perfect Circulation, consequently little or no Incrustation.

When all the above considerations are weighed, J. & F. HOWARD'S Boilers will be found to be the Cheapest and Best ever produced.

Prices delivered at Bedford Station.

	£	s.	d.
6-horse power, with Furnace and Boiler Mountings complete	68	10	0
8-horse power, with Furnace and Boiler Mountings complete	80	10	0
10-horse power, with Furnace and Boiler Mountings complete	95	10	0
12-horse power, with Furnace and Boiler Mountings complete	107	10	0
14-horse power, with Furnace and Boiler Mountings complete	119	0	0
16-horse power, with Furnace and Boiler Mountings complete	130	10	0
20-horse power, with Furnace and Boiler Mountings complete	152	10	0
25-horse power, with Furnace and Boiler Mountings complete	184	10	0
30-horse power, with Furnace and Boiler Mountings complete	215	10	0
35-horse power, with Furnace and Boiler Mountings complete	246	10	0
40-horse power, with Furnace and Boiler Mountings complete	270	10	0
45-horse power, with Furnace and Boiler Mountings complete	287	0	0
50-horse power, with Furnace and Boiler Mountings complete	308	10	0
60-horse power, with Furnace and Boiler Mountings complete	356	10	0

The BOILER includes the requisite number of vertical and horizontal tubes, and all necessary connections, the whole fitted together and proved to a cold water pressure of 500 lbs. per square inch before being sent away.

The FURNACE MOUNTINGS include furnace front, doors, dead plates, bearing bars, fire bars, damper and fittings, and stoking irons.

The BOILER MOUNTINGS consist of safety valve, junction valve, feed valve, blow-off tap, brass water gauge fittings, trial cocks and steam gauge, all fitted to the boiler complete.

The FIXING.—A man is sent to superintend, whose wages are charged at 6*s.* 8*d.* a day. His travelling expenses are charged the actual cost: board and lodging to be provided, or, if preferred, they can be charged at the rate of 8*s.* a day. Masonry and other expenses of erecting are at the cost of the purchaser.

INSTRUCTIONS

FOR

HOWARD'S PATENT SAFETY BOILER.

SETTING IN BRICKWORK.

Foundation.—Obtain a good foundation according to the dimensions marked on the ground plan; then mark off the side and cross walls, and build them up to the required height for the sections.

Smoke Burner and Dead Plates.—Put in the smoke burner, and the front and back dead plates for the fire bars as marked on the plan.

Arches.—The fire brick arches over the fire doors, and for carrying the further end of the sections, must be made very secure, the latter with a tie bolt and wall plates.

Front.—Fix the boiler front securely and closely to the front of the brickwork, by means of the stay bolts, so that the heat from the fire may not pass between it and the brickwork.

Sections.—When the bed is thus prepared for the sections, lift them into their respective positions side by side, according to the number marked on each. Let each section fall half an inch in three feet to the feed pipe, in order that the water and sediment may run from every part of the boiler to the blow-off cock.

Feed Pipe.—Put a packing ring into each of the recesses, and bolt each section to the feed pipe, but do not screw the bolts up too tightly.

Steam Pipes.—Lift up the steam pipe to its position, bringing the nipples opposite to the sockets, and put on each a little stiff red-lead. First screw the sockets on to each end of the steam pipe, being careful to keep the nipple close to the socket in starting; afterwards, in the same way, screw each of the other sockets on to its nipple, and when all are screwed up, bring up the back nuts to make them secure.

Tightening Up.—When all the sockets are tightened, screw tightly the two bolts which fasten each section to the feed pipe.

Filling the Boiler.—When the boiler is all put together, fill it with water, and before proceeding to build up the brickwork observe whether there is any leakage.

Brickwork.—If there is no leakage at any of the joints, the brickwork may be built up according to the plan. The brickwork must be well done in every part, and made firm with hoop iron bond. If the boiler stands independently, it will require extra tie rods to prevent the side walls from straining outwards.

Division and Covering Plates.—When the brickwork is high enough for the division flue plates, lay in the bearers and put in the small cast plates between the tubes, then build up the walls according to the plan and put on the covering plates.

Fire Bricks.—Fire brick lining must be used in the furnace chamber, and a fire brick arch to protect the bolts where the flame returns to the vertical tubes, but fire bricks need not be used above the division plates.

STARTING THE BOILER.

Drying the Brickwork.—The water having been put in as high as the middle of the gauge glass, a SLOW FIRE should be kept up so as to dry the brickwork very gradually.

Clearing out Grease.—Blow off the water once or twice before getting up the steam, or oftener if necessary, so as entirely to free the boiler from grease.

Trying Engine.—When the brickwork is dry, ascertain that your feed water supply is in good working order, fill up the boiler nearly to the top of the gauge glass, and get up sufficient steam to work the engine without its load.

Starting Machinery.—If you then find that everything is right and in working order, get up the steam to the full pressure and start the machinery.

WORKING THE BOILER.

Preparations for Starting.—Before lighting the fire, see that the water is at the proper height in the gauge glass and guage cock. When the steam is up, open the regulator valve very gradually to fill the pipes and let out the condensed water, before starting the engine.

Stopping.—Before stopping at meal-times, work the steam and fire down as much as you can, and fill the boiler to the top of the gauge glass; push the fire from the front towards the bridge, and close the damper so that it only just takes the smoke away.

Starting.—After meal-times, before starting the engine, blow out as much water from the boiler as will lower it three or four inches, in order to keep the water quite clean, and to prevent an accumulation of sediment.

Blowing off.—Once a week, blow out all the water from the boiler, but NOT UNTIL THE FIRE HAS BEEN OUT AT LEAST FIVE OR SIX HOURS, and the flues cooled down.

Sediment.—Every month or oftener, according to the quality of the water, the covers at the end of each horizontal tube should be taken off, ONE AT A TIME, and any sediment that may have collected, scraped out; each cover must be replaced and properly screwed up before another is taken off.

Soot.—Open the soot doors once or twice a month as may be found necessary, brush or scrape the tubes, and take out the dust.

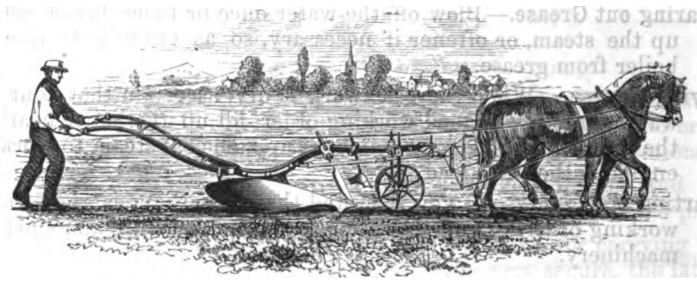
Taking out a Tube.—A vertical tube may be taken out from any part of the boiler by means of the wrenches provided. To do this, loosen the lock nut of the connecting pipe at the top of the tube, screw the connecting pipe back into the tube with a socket wrench, then unscrew the two bolts at the bottom, and lift up the tube.

Replacing a Tube.—When replacing a tube, the two bottom screws must be made tight before the connecting pipe is screwed up in its place.

Taking out a Section.—A whole section may be lifted out at once, after disconnecting it from the feed water and steam pipes. When any cleaning or repairs are required, sections may be periodically taken out, one after the other, with little loss of time.

HOWARD'S

CHAMPION PLOUGHS.



SEVENTY THOUSAND ARE IN USE, and MANY MORE are being sold at the PRESENT TIME than at any former period.

J. & F. HOWARD direct special attention to their Patent Champion Ploughs, which are improved forms of their original Prize Ploughs. They have been brought out with the greatest care, and after long and protracted experiments: the object sought being to combine the advantages of "high-cutting" ploughs, which lay the furrows at an acute angle, with those of the rectangular, or "low-cutting" ploughs. Every improvement has been adopted which has suggested itself during a long experience in the manufacture of Iron Ploughs, and J. & F. Howard believe their PATENT CHAMPION PLOUGHS to be far superior for general purposes to any ploughs yet produced.

The improvements consist in a more perfect form of the moving and cutting parts, increased simplicity, and greater strength, with less weight.

For many years J. & F. Howard have made the subject of improvements in Ploughs their careful study, and they have invariably kept in view the following objects:—

1. To make a plough that will cut and turn the work in the best manner, and suitable to the greatest variety of soil.
2. To obtain a form, the lightest in draught, and that will work the cleanest on sticky soils.
3. To substitute wrought iron or steel for cast iron, wherever desirable, so as to render every part strong and durable, without unnecessary weight.
4. To make every part free from complication, and to fit those parts subject to wear or breakage in the most simple manner, so that an ordinary ploughman shall have no difficulty in replacing them when in the field.
5. To make *the* plough that can be kept in order at the least expense; to which end J. & F. Howard have paid great attention to the quality of their shares and other wearing parts.

To insure perfect accuracy, J. & F. Howard have constructed patented machines for the production of their Plough Castings, by which means the trouble and delay, so often caused by wearing-parts fitting imperfectly, are entirely avoided.

HOWARD'S PATENT CHILLED SHARES,

Hardened by a process for which J. & F. Howard have obtained Her Majesty's Royal Letters Patent, will be found to WEAR SHARPER AND LAST LONGER than any shares produced by any other process ever yet discovered. They are made of various shapes and sizes to suit all descriptions of soil.

The *wrought iron* used in the construction of J. & F. Howard's Implements is "PATENT SCRAP" and is therefore of the best and most expensive description.

SOME OF THE ADVANTAGES OF

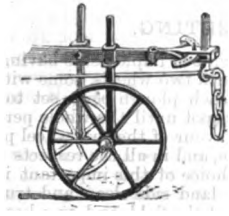
HOWARD'S PATENT CHAMPION PLOUGHS.

1. They are made principally of wrought iron, and are as light as they can be made consistently with durability.
2. The BEAMS are *ribbed* or flanged at the hinder part, which gives great strength where most required, and effectually prevents springing or bending.
3. The HANDLES and beams are made throughout in a piece, which effectually prevents their shaking loose, and also the accumulation of soil in the hinder part of the plough.
4. The FRAME or body, to which the lever neck is fitted, will not spring in hard work, and is formed so as to stand the roughest usage.
5. The BODY can be removed from the beam, and a Subsoil or Ridging body attached.
6. The BREASTS are formed so as to go clean on the most adhesive soil.
7. The LEVER NECK is so boxed in as not to be liable either to wear or breakage.
8. The LEVER NECK is tightened at the end, so that the objection to a lever neck becoming loose through wear is entirely avoided.
9. The COULTER is fastened by a wrought-iron clip; it is strong and simple, can be adjusted instantly and, being made to slide on the beam, the angle of the coulter can be altered as required.
10. The WHEEL FASTENINGS are most simple and, being made to tighten in the direction of the strain, are not liable to get loose through wear.
11. The DRAUGHT CHAIN is also of great advantage, as it removes all strain from the beam; the line of draught is also more direct, and consequently the power required is less.
12. The WEARING PARTS are all lettered and numbered, and can be replaced in the field by any labourer.

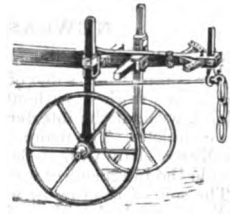
The WHEELS are fixed to the beam in the following manner:—

In each plan strong screws are used, and are made so as to stand a great amount of wear. The wheel standards are made of steel.

No 1, Wheel Fastenings.



No. 2, Wheel Fastenings.



In the No. 1 the furrow wheel is expanded by a sliding axle. It is a very simple and secure plan, and rather lighter than No. 2.

In the No. 2 plan the land wheel is made to expand as well as the furrow wheel, by lides through the beam. Ploughs run more steadily when thus fitted.

In the general arrangement of ploughs, J. & F. Howard have uniformly aimed at simplicity; and in this respect, as well as lightness of draught, they believe their

PATENT CHAMPION PLOUGHS WILL BE FOUND

THE BEST YET PRODUCED.

ALL PLOUGHS Manufactured by J. and F. HOWARD are branded "HOWARD, NEW PATENT," on the top of the beam; and as others purporting to be theirs are often offered for sale, they caution the public against purchasing any not branded in this manner.

HOWARD'S CHAMPION PLOUGHS.

The following Judges' Reports on Ploughs have appeared in the *Journal* of the Royal Agricultural Society of England :—

FIRST MEETING of the SOCIETY, HELD at OXFORD, 1839.

"The plough exhibited by Messrs. HOWARD, of Bedford, of small size, with a mould-board or furrow turner of excellent form, calculated to give the least resistance in turning over the furrow, was much approved."

BRISTOL MEETING.

"With regard to the excellence of the work done by the ploughs, as well as the lightness of draught, the palm of merit is unquestionably due to Messrs. HOWARD'S two-wheeled implement: the furrow bottom being left cleaner and flatter, the slice better turned and placed, and the depth more evenly maintained, than by any other of the competing ploughs. The dynamometer not only proved this plough to draw four stones lighter than any other, but also that it exhibited a peculiar steadiness of movement and uniformity of draught. The average draught of ploughs tried was 31¼ stones, whilst the draught of Messrs. HOWARD'S iron plough was but 22 stones, all ploughing six inches deep and nine inches wide, being upon the average nearly one-third less."

DERBY MEETING.

"Messrs. HOWARD, of Bedford, again produced their wheel ploughs, so much admired and rewarded at the Bristol Meeting, and which appeared from their action to have lost nothing of their excellence."

SHREWSBURY MEETING.

"The dynamometers of Mr. Clyburn and Mr. Bentall were both used at this meeting, and it appeared from each of them that Messrs. HOWARD'S plough took the least draught as well as made the best work: a result quite consistent with the experiments previously made at the Society's trials."

SOUTHAMPTON MEETING.

"Some very good work was done on the light as well as on the stiff soil by Messrs. HOWARD'S ploughs."

NEWCASTLE-ON-TYNE MEETING.

"Ploughing was first commenced on the light land, seventeen implements having been selected for competition, some of which were furnished with two wheels, some with one wheel, and some worked without a wheel or as swings; each plough being set to complete a land, without the interference of any party on the spot until the whole performance was complete. The manifestation of superiority in favour of the two-wheel plough made by Messrs. HOWARD, of Bedford, was unquestionable, and in all the respects which would guide the judgment of a competent farmer in his choice of this important implement. The sole of the furrow was cut perfectly flat, the land side clean and true, the furrow slices were laid with perfect uniformity throughout the field, and in a beautiful position for receiving the seed; the judges therefore awarded the first prize of £10 to Messrs. HOWARD.

"Fourteen ploughs operated upon the heavy land, and nearly similar distinctive characteristics were appreciated in the results; the judges again awarding the first prize of £10 to Messrs. HOWARD.

"The judges consider that all parties have much lee-way to fetch up before their implements can equal the work done by Messrs. HOWARD'S ploughs; indeed they are of opinion that no plough exhibited on this occasion possessed the power of construction to move soil to equal depth and with the same precision as Messrs. HOWARD'S implements."

NORTHAMPTON MEETING.

"For the trial of ploughs on light land twenty-two were selected, and the prize awarded to Messrs. HOWARD: the judges being quite satisfied with the numerous and excellent qualities of their plough, which they considered did great credit to its makers.

"Messrs. HOWARD'S plough was the same as that exhibited by them last year, at Newcastle, when the two first prizes were awarded to it, the judges having found it the best implement both on light and heavy land."

YORK MEETING.

"The ploughs tried were twenty-three in number. The trial took place on a cloverley of excellent quality for testing the good and bad properties of ploughs. We decided that Messrs. HOWARD'S plough was the best. We considered the furrow turner pretty near perfection, and calculated to plough any description of land that a plough can do. We had no hesitation, therefore, even amongst this numerous and excellent class, in deciding in favour of this plough."

NORWICH MEETING.

"The land upon which the ploughs were tried was of a hard and stubborn character, and we awarded the prize to Messrs. HOWARD'S 'Champion Plough.'"

EXETER MEETING.

"The trial ground was exceedingly favourable, of a strong loamy clay. In this class thirteen ploughs were set to work, with instructions to turn a furrow slice of not less than nine inches in depth leaving the width to the discretion of the exhibitors; after a few rounds, the plough by Messrs. HOWARD, of Bedford, showed itself to be superior, not only in turning the furrow slice in a complete and satisfactory manner, but in placing it in a proper position (as before mentioned), cutting out the furrow square, clean, and perfectly level."

LEWES MEETING.

"A new feature in Messrs. HOWARD'S ploughs deservedly obtained the Society's Medal. The improvement consisted in making the box or nave of the wheels so as to preclude the possibility of dust, soil, &c., being cast on the spindle; thus obviating a defect so commonly observed, viz. that the wheels, if even constantly oiled, are ground untrue."

GLOUCESTER MEETING.

"*Ploughs for general purposes.*—Among the number sent out for trial, the superiority of that class with which Messrs. HOWARD'S name has been so long connected was soon evident."

LINCOLN MEETING.

"*Deep Ploughing.*—Six ploughs competed in this class, four of which were soon seen to be incapable of standing the severe test to which they were subjected; the remaining two performed their work well, and, notwithstanding their being put to the severest test by eight selected horses, they both passed steadily through the work, making a fair and tolerable furrow, ten inches deep, on an almost impervious clay soil. Subsequently they were tested on a milder portion of the field at a less depth with four horses, and the work done by Messrs. HOWARD'S plough appeared to us not only the cleanest cut, but the most effectually turned and laid up, less earth falling back into the furrow, and a somewhat broader furrow sole also being left; consequently we awarded the prize to Messrs. HOWARD."

CHELMSFORD MEETING.

"*Ploughs for general purposes.*—Two series of experiments were made in this class; first, on rather a light loamy soil, and, next, on soil naturally strong (but rendered stronger by the treading of stock), and unusually hard from the dryness of the weather. In the light land, the work done by Messrs. HOWARD'S plough, in particular, exhibited a marked superiority; it was, however, in the strong land that the capabilities of the several implements were worthily tested; and none but ploughs of the best construction had the smallest chance of success. The merits of several ploughs appeared at times pretty evenly balanced, yet the performance of Messrs. HOWARD'S plough was upon the whole such as clearly to entitle it to be placed the first in this class; the first prize was therefore awarded to Messrs. HOWARD.

"*Ploughs best adapted for heavy land.*—This trial was upon a field of seeds pastured, on a strong heavy soil, very hard and dry, and in which none but the best ploughs could possibly work. The conditions were that the furrows should be eight inches deep by ten inches wide, the turf to be pared and deposited under the furrow. Notwithstanding the unfavourable condition of the ground, the furrows were cut with great cleanness and regularity, the turf was pared, turned, and deposited with facility and completeness, and the result of this trial afforded a striking proof how ample and complete is the control which our best constructed ploughs now give over the most stubborn soils in the country. The judges awarded the first prize to Messrs. HOWARD.

"*Ploughs best adapted to light land.*—These were tried upon a field of light loamy soil, in most favourable condition for exhibiting excellence of work. The superior work of Messrs. HOWARD'S plough, combined with its lightness of draught, induced the judges to award to them the first prize."

WARWICK MEETING.

"*The general purpose ploughs*, perhaps the most useful under trial, stood the heavy land traction with good effect, and firmly met the resistance offered. The first prize was awarded to Messrs. HOWARD'S H H plough."

NEWCASTLE MEETING.

"*General Purpose Ploughs.—Wheel Ploughs.*—We tried ten ploughs in each division of this class, which, as might be anticipated, was most attractive to the numerous spectators. It is manifest that an implement capable of economical work in soils light and heavy, and equally available for shallow or deep work, will be more sought for than such as are suitable to particular cases only. We tried these ploughs at two depths, first at five inches, and afterwards at seven inches, and such was the condition of the soil that it was quite sufficient work for two powerful horses to draw the implement at the latter depth." (The first and only prize was awarded to J. & F. HOWARD.)

LEICESTER MEETING, 1868.

GENERAL PURPOSE WHEEL PLOUGHS.

"The quality of the work by the whole [of the selected competitors] was so superior as to necessitate us to go to the severer test of clearing the bottom of the furrows, so as to show that part of their work, as well as the surface. This test was rather considered by some of the exhibitors to be 'unbecoming;' at all events it was unexpected. However, it so exposed that most essential part of the plough's work as to enable us to make a further selection for the 'final trial,' viz. Messrs. HOWARD [and two others], each to take four bouts at seven inches deep."

"After laying bare the soil and using the scraper across the whole piece, we found the work altogether superior; but taking into consideration how they stood with each other in the two former trials, we at once placed them thus, awarding to Messrs. J. & F. HOWARD [the First Prize]."

LIGHT-LAND WHEEL PLOUGHS.

"All the competitors executed their work most admirably, but the application of the test exposing the cut at the bottom enabled us to make the following award:—Messrs. J. & F. HOWARD [the First Prize]."

SWING PLOUGHS.

"In dealing with these implements we could not for a moment entertain the idea of dividing them into three classes, from the almost utter impracticability of a man satisfactorily holding a swing-plough for deep purposes. Indeed, with only 'General Purpose and Light-land swing Ploughs' we shall have no small difficulty in ascertaining the plough's merits, for the character of the work so much depends on the efficiency of the ploughman, regardless of the mechanical construction of the implement. We therefore have divided Swing-ploughs into two classes only—General Purpose and Light-land Ploughs."

GENERAL PURPOSE SWING PLOUGHS.

"We selected five for a second trial, which were required to take four furrows each at seven inches deep. This trial was soon completed, and we awarded the following:—Messrs. J. & F. HOWARD [The First Prize]."

LIGHT-LAND SWING PLOUGHS.

"Evidently depth had great influence upon the ploughmen's exertions, as they appeared much more comfortable in the execution of this work than the former. . . . Three were selected for a second trial. . . . It may be supposed that with three such implements, each wielded by the crack ploughmen and horses of the firm, the work would be *well* done: but it was beyond that,—it was EXCELLENT. However, after applying the test of laying bare the furrows, we were enabled to decide and make the following award, viz.—Messrs. J. & F. HOWARD [The First Prize]."

The above is the last Report issued by the Society.

COPY OF CIRCULAR ADDRESSED TO VARIOUS AGRICULTURAL SOCIETIES A FEW YEARS AGO.

Britannia Iron Works,
BEDFORD, January 1, 1866.

Sir,

Having attended most of the All England Ploughing Matches for five years past, and thereby gained a thorough knowledge of the kind of Ploughs best suited for the various districts throughout the country, it is not our intention to send our Ploughmen to compete at any of the Matches this year.

The object of these All England Ploughing Matches is defeated, and the Local Ploughmen are placed at great disadvantage, by the present practice of competing with Ploughs made specially for Match purposes, and which are too long and too heavy for general use, and for which, consequently, there is no demand.

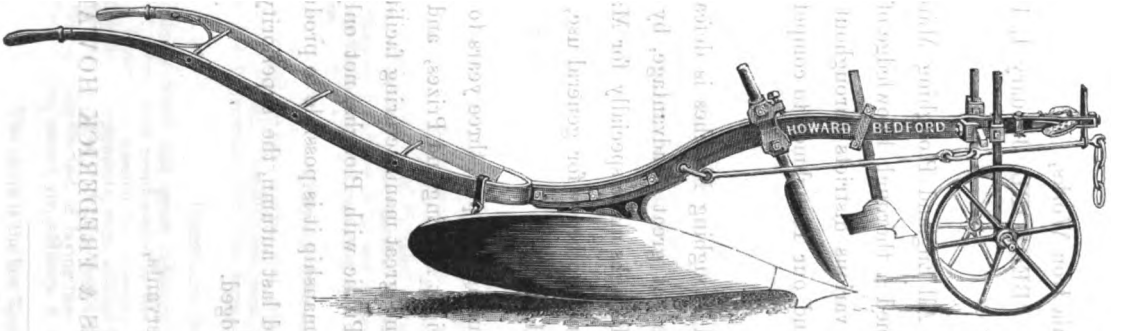
It has been our good fortune during the past three years to win the unprecedented number of Sixty-eight All England Prizes, and we believe from our long experience and great manufacturing facilities, we are in a position to supply the Public with Ploughs, not only of the best design, but of the best workmanship it is possible to produce. At almost every Meeting we attended last autumn, the superiority of our Plough was universally acknowledged.

Your faithful servants,

JAMES & FREDERICK HOWARD.

HOWARD'S CHAMPION PLOUGHS have won more All England and Champion Prizes in the hands of Local Ploughmen, than those of any other maker.

HOWARD'S PATENT IRON PLOUGH, MARKED B.



The FIRST PRIZE for the BEST WHEEL PLOUGH for LIGHT LAND was gained by this Plough at the last Great Trials of the Royal Agricultural Society of England, held at Leicester, 1868.

HOWARD'S WHEEL PLOUGHS have received about DOUBLE THE NUMBER OF FIRST PRIZES from the Royal Agricultural Society of England, to those of any other maker.

HOWARD'S CHAMPION PLOUGHS were the ONLY ENGLISH PLOUGHS in the LIST of AWARDS of GOLD MEDALS at the PARIS EXHIBITION, 1867, and the FIRST GOLD MEDAL as well as a GRAND PRIZE were awarded to J. & F. HOWARD for Ploughs and other Agricultural Machinery.

This Plough is an improved form of J. & F. Howard's original Prize Plough, and has been brought out with the greatest care, and after long and protracted experiments; the object sought being to combine the advantages of "high cutting" ploughs, which lay the furrows at an acute angle, with those of the rectangular, or "low cutting" ploughs. Short breasts can be had, if preferred.

This Plough is suitable for both light and heavy land; and while light enough for two horses, is strong enough for four. It is recommended as the most generally useful two-horse plough.

	£	s.	d.
Price	4	12	6
Skim coulter	0	5	0
Drag chain	0	1	6

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 7*s.* 6*d.* extra. Steel side cap, 2*s.* 6*d.* extra.

The average weight of this plough is 2¼ cwt.

HOWARD'S PATENT IRON PLOUGH, MARKED B B.

The FIRST PRIZE for the BEST WHEEL PLOUGH for GENERAL PURPOSES was gained by this Plough at the last Great Trials of the Royal Agricultural Society of England, held at Leicester, 1868. This is the MOST IMPORTANT PRIZE for Ploughs offered by the Society, it being for the Plough best adapted for both light and heavy land, as well as for the best work at various depths.

HOWARD'S CHAMPION PLOUGHS have, ever since 1855, won ALL THE PRIZES offered by the Royal Agricultural Society of England for the BEST WHEEL PLOUGH FOR GENERAL PURPOSES.

At the PARIS EXHIBITION, 1867, this Plough won the FIRST PRIZE in the International Trials, as the BEST PLOUGH for GENERAL PURPOSES.

This Plough is on the same principle as the above, but is a size larger, and is intended for general purposes. It is more suitable for deep work or match ploughing than the B plough, but is not so generally liked for two-horse work. Short breasts can be had, if preferred.

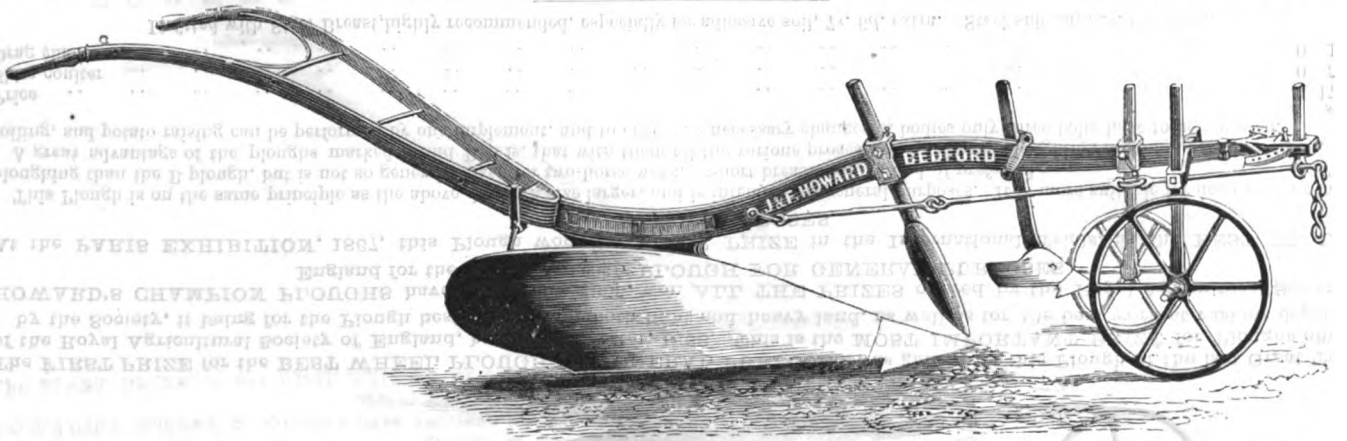
A great advantage of the ploughs marked B and B B is, that with them all the various processes of ordinary ploughing, digging, paring, ridging, subsoiling, and potato raising can be performed by one implement, and to effect the necessary changes of bodies only three bolts have to be removed.

	£	s.	d.
Price	4	17	6
Skim coulter	0	5	0
Drag chain	0	1	6

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 7*s.* 6*d.* extra. Steel side cap, 2*s.* 6*d.* extra.

The average weight of this plough is 2¾ cwt.

HOWARD'S PATENT IRON PLOUGH, MARKED BBB.



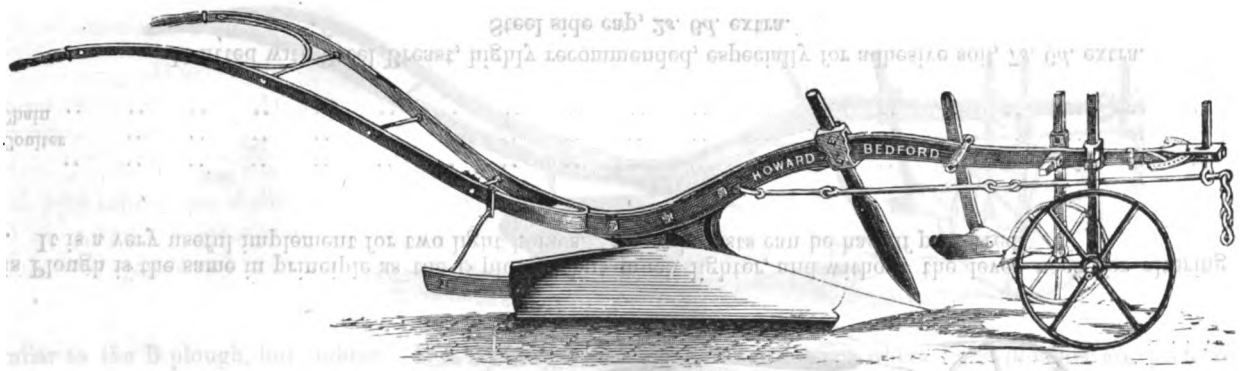
This Plough is on the same principle as the B B plough, but much larger, and is intended only for extra deep or *trench* ploughing with four or six horses. Every part is made very strong so as to resist large stones or roots, and it will be found well adapted for Colonial purposes where new land has to be brought into cultivation. It may also be fitted with a breast for ploughing out two deep furrows previous to draining.

	£	s.	d.
Price	7	10	0
Skim coulter	0	6	0
Drag chain	0	1	6

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 15*s.* extra. Steel side cap, 5*s.* extra.

The average weight of this plough is 8¼ cwt.

HOWARD'S PATENT IRON KENT PLOUGHS.

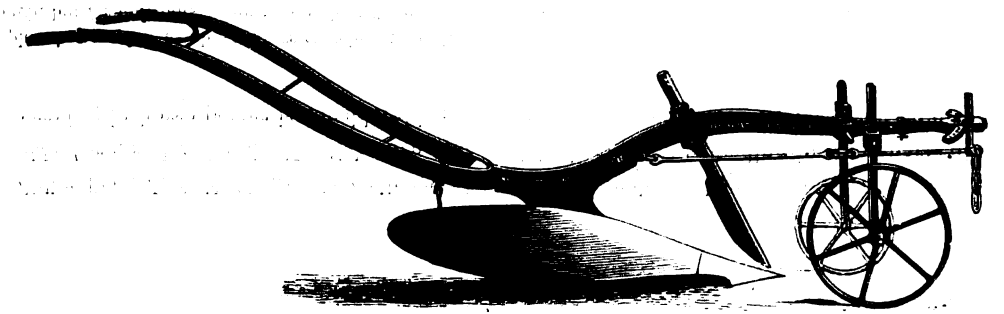


These Ploughs differ from J. & F. Howard's ordinary ploughs, inasmuch as they are constructed to turn the furrow completely over, or *upside down*, as by the old Kentish turn-rest, which they are superseding in some parts of that and the adioining counties. The saving in horse power is considerable; one, and in many cases, two horses may be dispensed with.

	£	s.	d.
Price of a pair-horse plough, complete as above, average weight 2¾ cwt...	5	10	0
Price of a similar plough, but for four horses, average weight 3¼ cwt.	6	0	0

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 7*s.* 6*d.* extra. Steel side cap, 2*s.* 6*d.* and 4*s.* extra.

HOWARD'S PATENT IRON PLOUGH, MARKED SB.



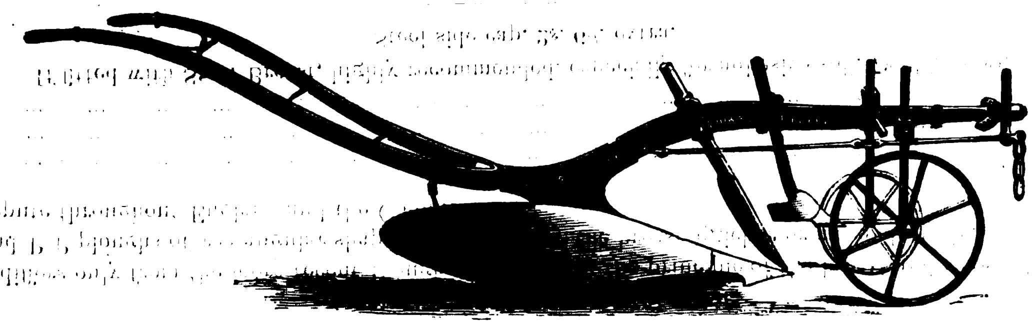
This Plough is the same in principle as the B plough, but much lighter, and without the lever neck for altering pitch of share. It is a very useful implement for two light horses. Short breasts can be had, if preferred.

	£	s.	d.
Price	3	17	6
Skim Coulter	0	5	0
Drag Chain	0	1	6

It fitted with Steel Breast, highly recommended, especially for adhesive soil, 7*s.* 6*d.* extra.
Steel side cap, 2*s.* 6*d.* extra.

The average weight of this plough is 2 cwt.

HOWARD'S PATENT IRON PLOUGH, MARKED LB.



Similar to the B plough, but lighter. It is recommended for hilly countries, or where light ploughs are preferred, and is adapted for one or two horses. Although strong, it is not intended for such hard work as the larger ploughs. Short breasts can be had, if preferred.

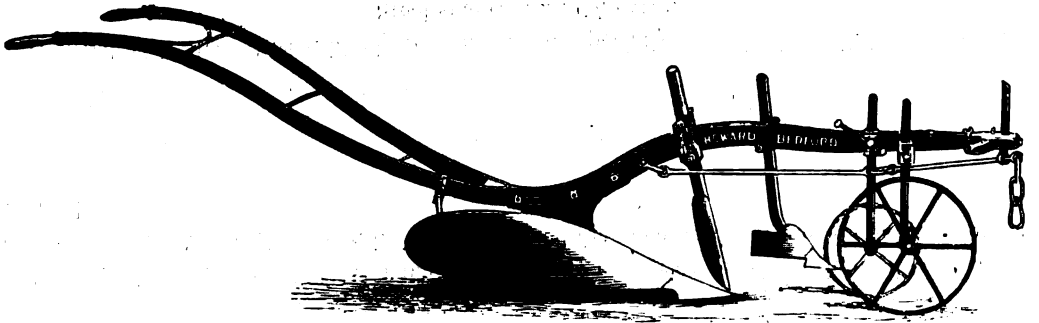
	£	s.	d.
Price	4	5	0
Skim coulter	0	5	0
Drag chain	0	1	6

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 7*s*. 6*d*. extra.

Steel side cap, 2*s*. 6*d*. extra.

The average weight of this plough is $2\frac{1}{4}$ cwt.

HOWARD'S PATENT IRON PLOUGH, MARKED P.



This Plough differs only from the more recent Plough marked B, in the principle of the breast and share, the furrows being cut by the P and P P ploughs of rectangular shape, and turned by the breast quicker or more abruptly. This plough is still in very high repute throughout England and the Colonies.

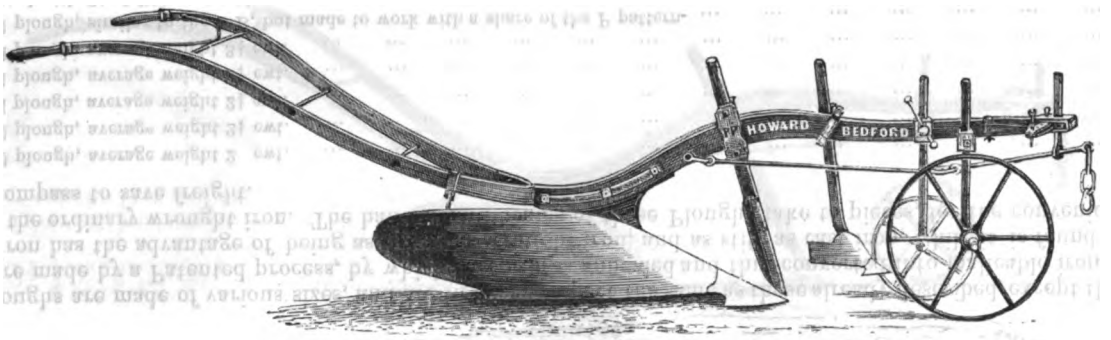
	£	s.	d.
Price	4	12	6
Skim coulter	0	5	0
Drag chain	0	1	6

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 7*s.* 6*d.* extra.

Steel side cap, 2*s.* 6*d.* extra.

The average weight of this plough is 2½ cwt.

HOWARD'S PATENT IRON PLOUGH, MARKED P P.



This Plough differs only from the more recent Plough marked B B, in the principle of the breast and share, the furrow being cut by the P and P P ploughs of rectangular shape, and turned by the breast quicker or more abruptly. This plough is still in very high repute throughout England and the Colonies.

	£	s.	d.
Price	4	17	6
Skim coulter	0	5	0
Drag chain	0	1	6

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 7*s*. 6*d*. extra.

Steel side cap, 2*s*. 6*d*. extra.

The average weight of this plough is $2\frac{3}{4}$ cwt.

HOWARD'S PATENT IRON COLONIAL PLOUGHS.

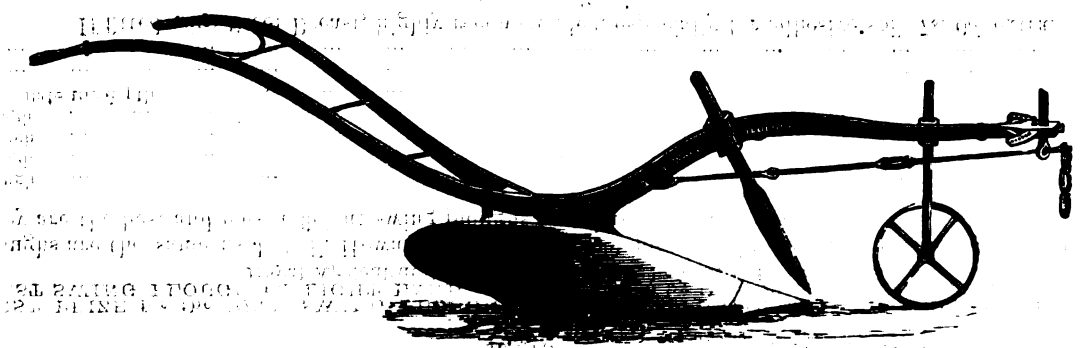
These Ploughs are made of various sizes, and are in every respect the same as those already described, except that the Frames or Bodies are made by a Patented process, by which cast iron is annealed and thus converted into malleable iron. This Patent Malleable Iron has the advantage of being as tough as wrought iron, and as stiff as cast iron, while it is found to stand much better than the ordinary wrought iron. The handles and beams of these Ploughs take to pieces, for the convenience of packing in a small compass to save freight.

		£	s.	d.
S B	colonial plough, average weight 2 cwt.	4	5	0
L B	colonial plough, average weight 2¼ cwt.	4	12	6
B	colonial plough, average weight 2½ cwt.	5	0	0
B B	colonial plough, average weight 2¾ cwt.	5	5	0
B B B	colonial plough, average weight 3¼ cwt.	8	0	0
J P	colonial plough, similar to the S B, but made to work with a share of the P pattern	4	5	0

If fitted with Steel Breast, highly recommended, especially for adhesive soil, S B, L B, B, B B, and J P, 7*s.* 6*d.*, and B B B, 15*s.* extra.
Steel side cap, S B, L B, B, B B, and J P, 2*s.* 6*d.*, and B B B, 5*s.* extra.

Almost any of J. & F. Howard's ordinary Ploughs can be had with the Patent Malleable Iron Frames for 7*s.* 6*d.* extra.

HOWARD'S PATENT IRON PLOUGHS WITH ONE WHEEL.



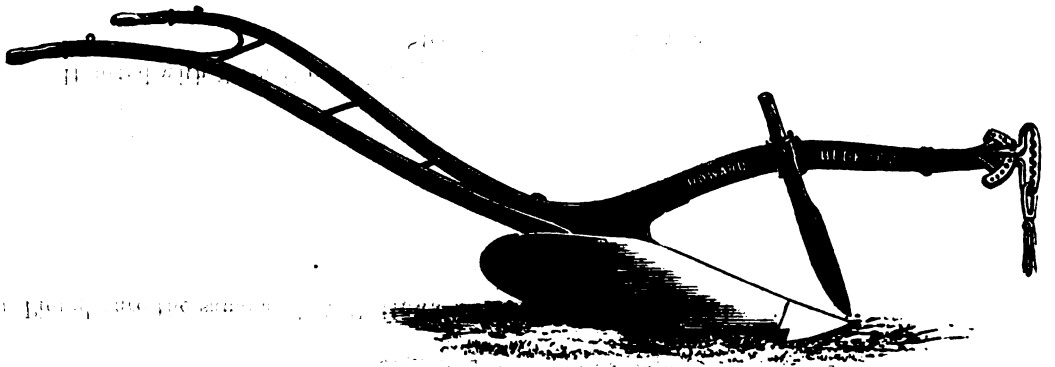
These Ploughs are the same as J. & F. Howard's ordinary wheel ploughs, but fitted with the land wheel only.

	£	s.	d.
S B plough	3	7	6
L B plough	3	15	0
B plough	4	2	6
B B plough	4	7	6
Skim coulter	0	5	0
Drag chain	0	1	6

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 7*s.* 6*d.* extra.
Steel side cap, 2*s.* 6*d.* extra.

The average weight of these ploughs is 2 cwt.

HOWARD'S PATENT IRON SWING PLOUGHS.



The FIRST PRIZE for the BEST SWING PLOUGH for GENERAL PURPOSES, as well as the FIRST PRIZE for the BEST SWING PLOUGH for LIGHT LAND ... both gained by these Ploughs at the last Great Trials of the Royal Agricultural ... England, held at Leicester, 1868.

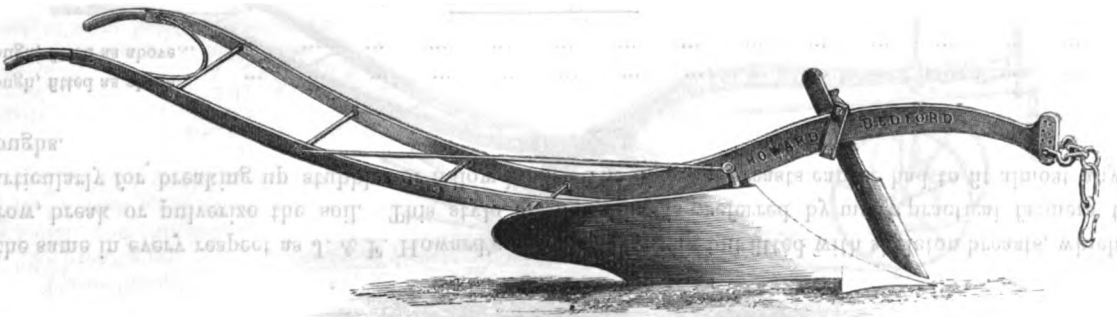
These Ploughs are the same as J. & F. Howa... wheel ploughs, but are made with longer handles and shorter beams. They are the best and most efficient swing plough ... have yet produced.

	£	s.	d.
S B swing plough	3	10	0
L B swing plough	3	17	6
B swing plough	4	5	0
B B swing plough	4	10	0
Slide foot to regulate the depth	0	8	6
Skim coulter	0	5	0
Drag chain	0	1	6

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 7*s.* 6*d.* extra.
Steel side cap, 2*s.* 6*d.* extra.

The average weight of these ploughs is 2 cwt.

HOWARD'S PATENT SCOTCH SWING PLOUGHS.



The above are the well known Scotch Swing Ploughs, which are in great demand amongst Scotch emigrants and others in the Colonies. They are fitted with wrought-iron shares, and are made with J. & F. Howard's improvements in the formation of the breasts and other parts, as well as in style and workmanship.

		£	s.	d.
S C	swing Plough, for 2 horses, average weight 2 cwt.	4	15	0
S S C	swing Plough, for 4 horses, average weight 3 cwt.	6	10	0

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 7*s.* 6*d.* extra.

Steel side cap, 2*s.* 6*d.* extra.

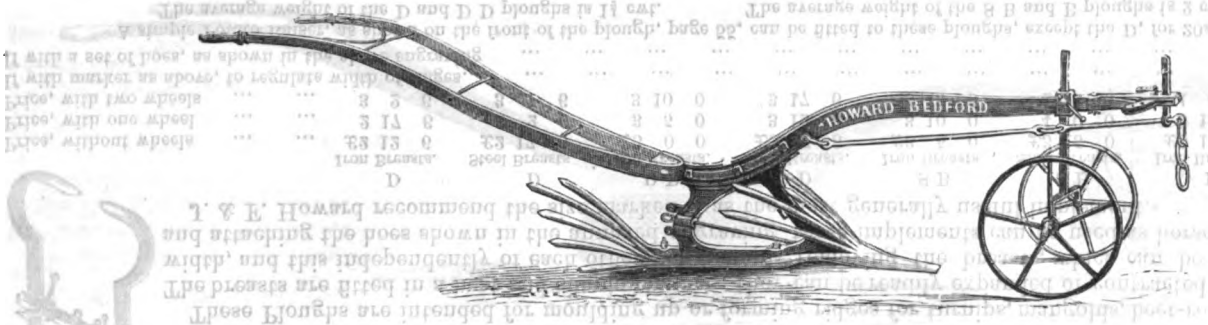
HOWARD'S IMPROVED PATENT IRON DIGGING PLOUGHS.

These are the same in every respect as J. & F. Howard's ordinary Ploughs, but fitted with skeleton breasts, which, in turning over the furrow, break or pulverize the soil. This style of ploughing is preferred by many practical farmers to ordinary ploughing, particularly for breaking up stubbles or fallow land. The digging breasts can be had to fit almost any of J. & F. Howard's Ploughs.

	£	s.	d.
Price of B plough, fitted as above	4	12	6
Price of B B plough, fitted as above...	4	17	6

The average weight of these ploughs is 2¾ cwt.

HOWARD'S IMPROVED POTATO-RAISING PLOUGH.

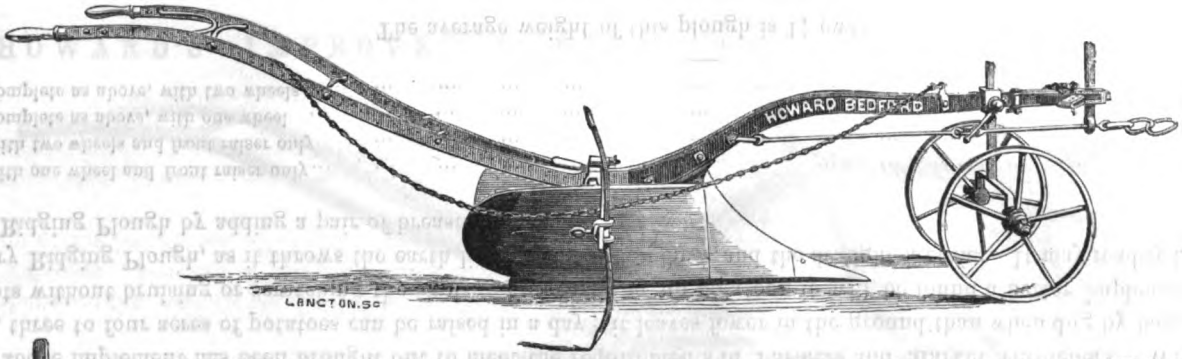


The above implement has been brought out to meet the requirements of Farmers and Market Gardeners. With a pair of horses, three to four acres of potatoes can be raised in a day; it leaves fewer in the ground than when dug by hand, and raises the roots without bruising or scratching the skins. For earthing up potatoes, it will be found a better implement than the ordinary Ridging Plough, as it throws the earth lightly on to the plants, and the draught is easier. It may readily be converted into a Ridging Plough by adding a pair of breasts.

	£	s.	d.
Price, with one wheel and front raiser only	3	12	6
Price, with two wheels and front raiser only	3	17	6
Price, complete as above, with one wheel	4	10	0
Price, complete as above, with two wheels	4	15	0

The average weight of this plough is $1\frac{3}{4}$ cwt.

HOWARD'S PATENT DOUBLE-BREAST OR RIDGING PLOUGHS.



The only PRIZE ever offered by the Royal Agricultural Society of England for RIDGING PLOUGHS was awarded to J. & F. Howard.

These Ploughs are intended for moulding up or forming ridges for turnips, mangolds, beet-root, and potatoes. The breasts are fitted in a neat and simple manner: they can be readily expanded or contracted to any required width, and this independently of each other. By simply removing the breasts, which can be done instantly, and attaching the hoes shown in the annexed engraving, these implements can be used as horse hoes.

J. & F. Howard recommend the size marked B as the most generally useful implement.

	D Iron Breasts.	D Steel Breasts.	D D Iron Breasts.	D D Steel Breasts.	S B Iron Breasts.	S B Steel Breasts.	B Iron Breasts.	B Steel Breasts.
Price, without wheels	£2 12 6	£2 17 6	£3 0 0	£3 7 6	£3 5 0	£3 15 0	£3 10 0	**£4 0 0**
Price, with one wheel	2 17 6	3 2 6	3 5 0	3 12 6	3 10 0	4 0 0	3 15 0	**4 5 0**
Price, with two wheels	3 2 6	3 7 6	3 10 0	3 17 6	3 15 0	4 5 0	4 0 0	**4 10 0**
If with marker as above, to regulate width of ridges...	...	...	...	...	...	...	...	... extra **0 8 6**
If with a set of hoes, as shown in the above engraving	...	...	...	...	...	...	...	... extra **0 11 0**

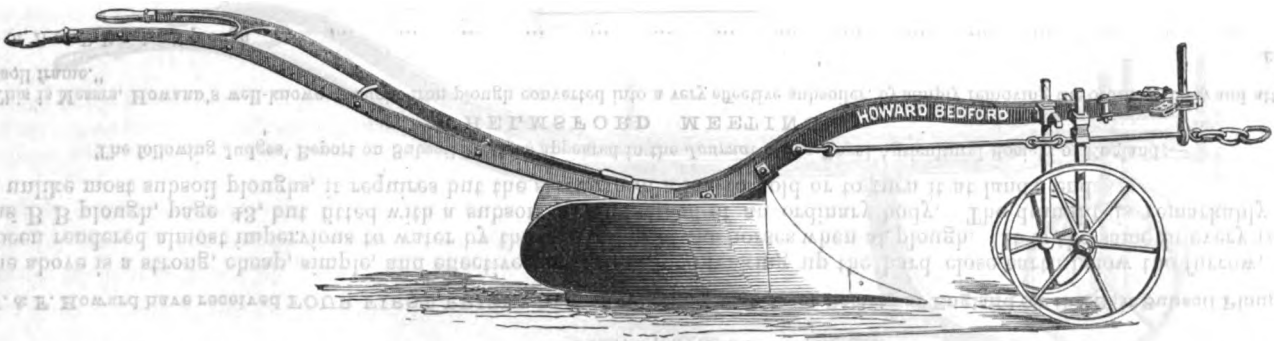
A simple Potato Raiser, as shown on the front of the plough, page 55, can be fitted to these ploughs, except the D, for 20*s.* extra.

The average weight of the D and D D ploughs is 1¼ cwt. The average weight of the S B and B ploughs is 2 cwt.

Howard's original pattern Ridging Plough, marked P, same price as B.

Case-hardened Points and Shares of various widths are made to fit the above.

HOWARD'S PATENT DOUBLE-BREAST OR RIDGING PLOUGH MARKED B B.



The above is intended for ridging up land after the Steam Cultivator, and is calculated to work at a greater depth than the smaller Ridging Ploughs. On farms where the Steam Cultivator is used, it will be found a valuable implement for ridging up land, or laying it in trenches for the winter. It is also equally well adapted for forming ridges for turnips, mangolds, beet-root, and potatoes.

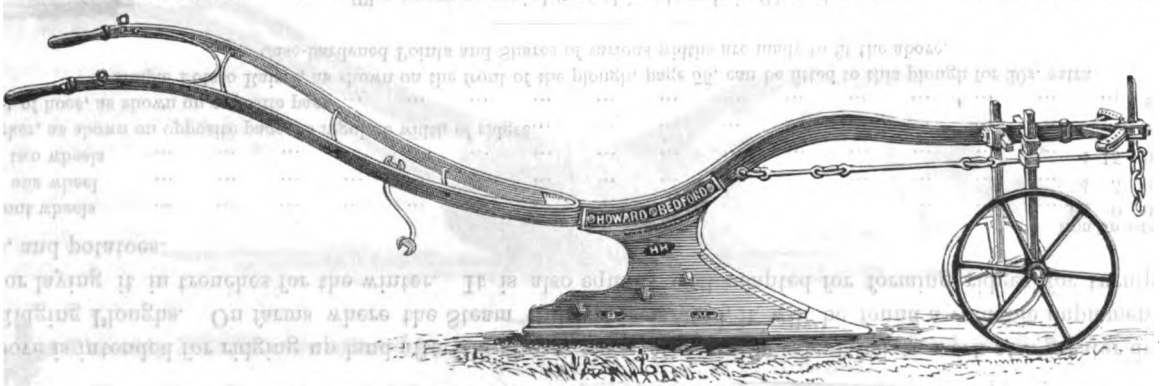
	Iron Breasts.	Steel Breasts.
Price, without wheels	£4 0 0	£4 10 0
Price, with one wheel	4 5 0	4 15 0
Price, with two wheels	4 15 0	5 5 0
If with marker, as shown on opposite page, to regulate width of ridges	extra	0 8 6
If with a set of hoes, as shown on opposite page	extra	0 11 0

A simple Potato Raiser, as shown on the front of the plough, page 55, can be fitted to this plough for 20s. extra.

Case-hardened Points and Shares of various widths are made to fit the above.

The average weight of this plough is 2½ cwt.

HOWARD'S PATENT IRON SUBSOIL PLOUGH.



J. & F. Howard have received FOUR FIRST PRIZES from the Royal Agricultural Society of England for the Best Subsoil Plough.

The above is a strong, cheap, simple, and effective implement for breaking up the hard close earth below the furrow, which has been rendered almost impervious to water by the trampling of the horses when at plough. It is the same in every respect as the B B plough, page 43, but fitted with a subsoil frame instead of an ordinary body. The draught is remarkably light, and, unlike most subsoil ploughs, it requires but the strength of a lad to hold or to turn it at land's end.

The following Judges' Report on Subsoil Ploughs appeared in the *Journal* of the Royal Agricultural Society of England:—

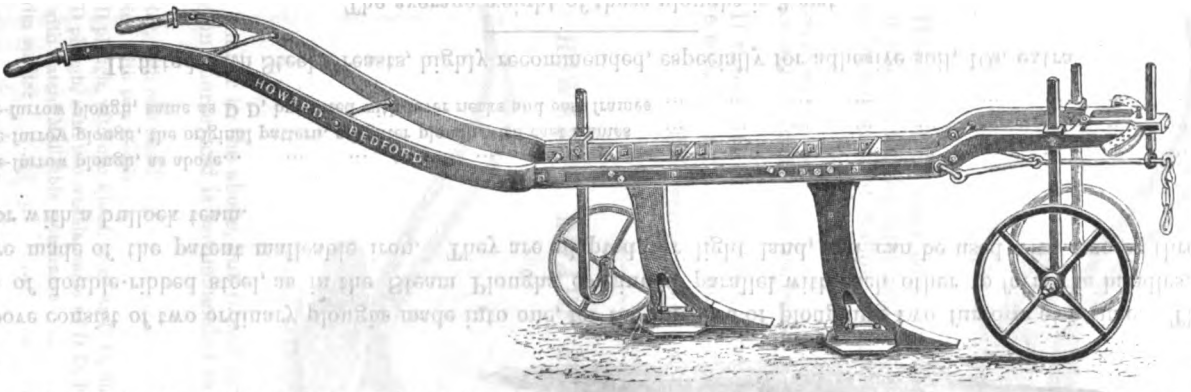
CHELMSFORD MEETING.

"This is Messrs. HOWARD's well-known wrought-iron plough converted into a very effective subsoiler, by simply removing the ordinary body and attaching a subsoil frame."

	£	s.	d.
Price of B or B B subsoil plough			

The average weight of these ploughs is 2 cwt.

HOWARD'S PATENT IRON DOUBLE SUBSOIL PLOUGH.



The FIRST PRIZE for the BEST SUBSOIL PLOUGH was gained by this Plough at the last Great Trials of the Royal Agricultural Society of England, held at Leicester, 1868.

This is the strongest and most effective implement yet produced for the purpose of subsoiling, as it moves the whole of the ground with as little draught as an ordinary single-tined implement. It is also useful for breaking up headlands, after the steam ploughing engine.

The following Judges' Report on Subsoil Ploughs appeared in the *Journal* of the Royal Agricultural Society of England:—

LEICESTER MEETING, 1868.

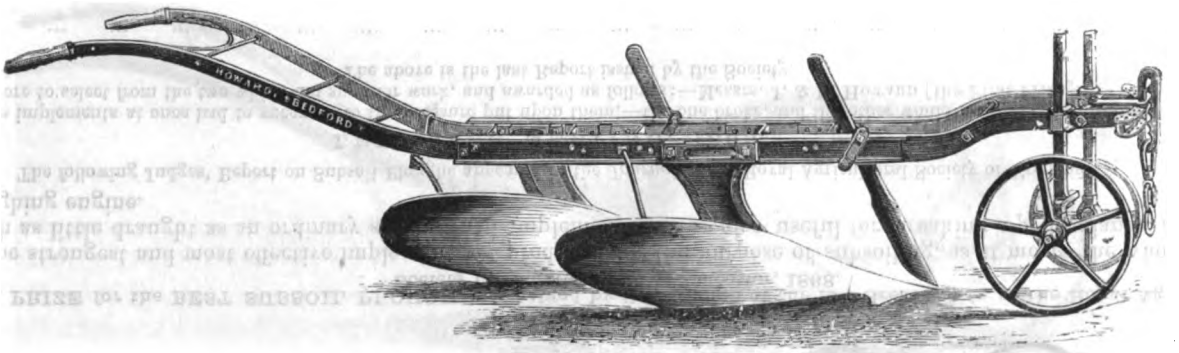
"Two of the implements at once had to succumb to the pressure put upon them,—the one broke, and the other would not enter the ground at the depth. We had therefore to select from the two which did superior work, and awarded as follows:—Messrs. J. & F. Howard [the First Prize]."

The above is the last Report issued by the Society.

	£	s.	d.
Price	5	10	0

The average weight of this plough is 2½ cwt.

HOWARD'S PATENT IRON DOUBLE-FURROW PLOUGHS.



The above consist of two ordinary ploughs made into one, for the purpose of ploughing two furrows at a time. The beams are made of double-ribbed steel, as in the Steam Ploughs, continued parallel with each other to form the handles, and the frames are made of the patent malleable iron. They are adapted for light land, and can be used with two or three horses abreast, or with a bullock team.

	£	s.	d.
H B double-furrow plough, as above...	8	0	0
D D double-furrow plough, the original pattern, a lighter plough with cast frames	6	0	0
P D double-furrow plough, same as D D, but fitted with lever necks and cast frames	6	15	0

If fitted with Steel Breasts, highly recommended, especially for adhesive soil, 10s. extra.

The average weight of these ploughs is 3 cwt.

HOWARD'S DWARF PLOUGH, MARKED D.

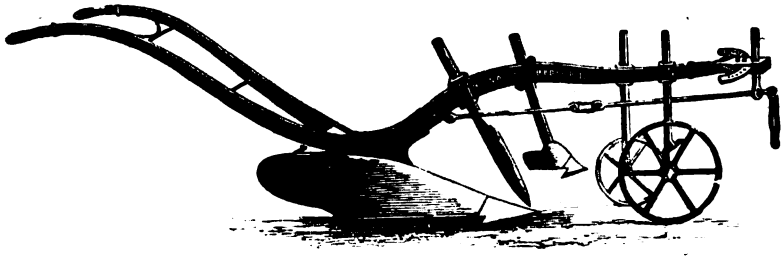
This Plough is intended to be worked by a small horse or bullock. It is adapted for the light land of the Continent, for stirring loose soil, and for any kind of shallow ploughing where the draught is easy.

	£	s.	d.
Price, as above	2	7	6
Price, with Patent Malleable iron frame	2	12	6

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 5*s*. extra. Steel side cap, 2*s*. extra.

The average weight of this plough is 1¼ cwt.

HOWARD'S DWARF PLOUGH, MARKED D D.



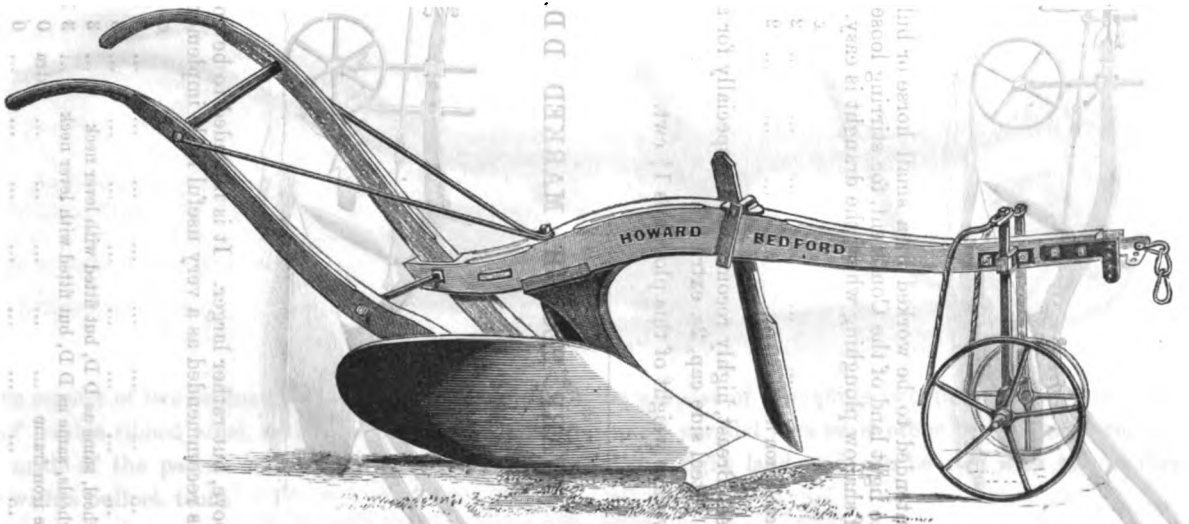
Similar to the above, but rather larger. It is intended to be worked by one horse, and is recommended as a very useful little implement.

	£	s.	d.
Price, with one wheel	2	17	6
Price, with two wheels	3	7	6
P D plough, with one wheel, same as D D, but fitted with lever neck ...	3	5	0
P D plough, with two wheels, same as D D, but fitted with lever neck ...	3	15	0
If with Patent Malleable iron frame ... ... extra	0	5	0
Skim coulter	0	5	0

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 5*s*. extra. Steel side cap, 2*s*. extra.

The average weight of these ploughs is 1½ cwt.

HOWARD'S ANGLO-AMERICAN PLOUGH MARKED AE.



J. & F. Howard, finding that a simple plough with wooden beam and handles is in demand in some of the Colonies as well as on the Continent, have for some time past given their special attention to the construction of such implements. They have accordingly brought out a set of wood ploughs of different sizes, which they confidently recommend as light, durable, simple, and strong.

	£	s.	d.
A E plough, as above, average weight 2 cwt....	3	15	0
A D plough, similar to the above, but rather lighter, average weight 1¼ cwt.	3	10	0

If fitted with Steel Breast, highly recommended, especially for adhesive soil, A D 5*s.*, and A E 7*s.* 6*d.* extra.

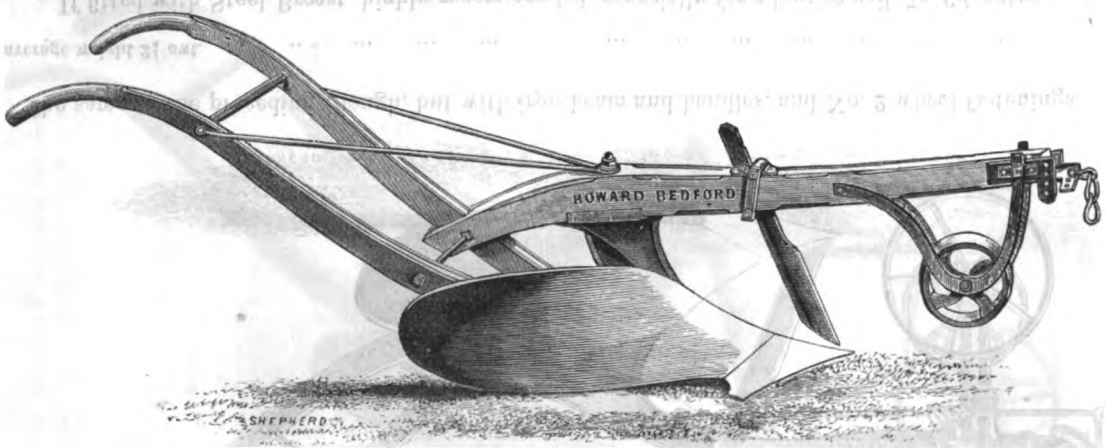
HOWARD'S IRON ANGLO-AMERICAN PLOUGH MARKED AE.

The same as the preceding Plough, but with iron beam and handles, and No. 2 wheel fastenings.

	£	s.	d.
Price, as above, average weight 2¼ cwt.	4	5	0

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 7*s.* 6*d.* extra.

HOWARD'S ANGLO-AMERICAN PLOUGH, MARKED AE.



The same as the preceding Plough, but with wood beam and handles, and fitted with one wheel.

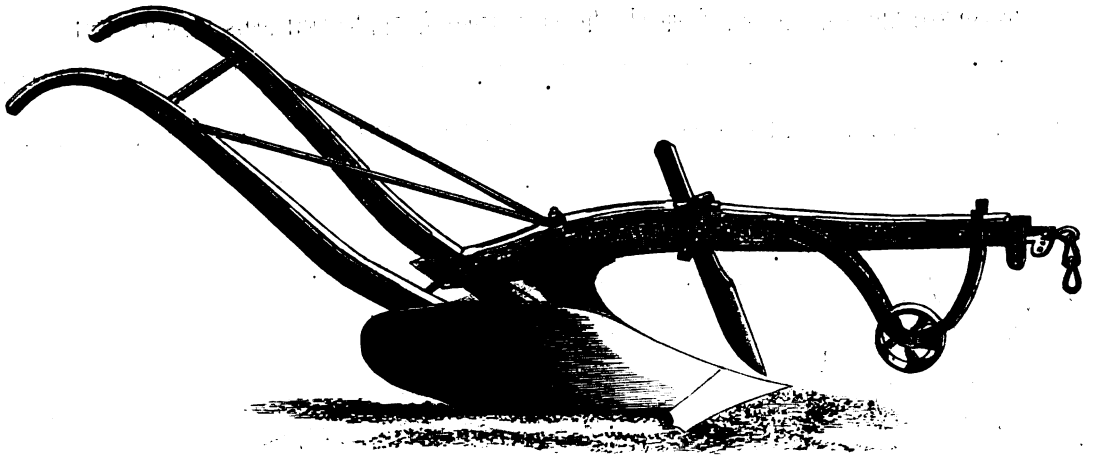
	£	s.	d.
Price, as above, average weight 1¾ cwt.	3	0	0
Price, without wheel	2	15	0

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 7*s*. 6*d*. extra.

A D plough, similar to the above, but rather lighter, average weight 1¼ cwt.	2	15	0
A D plough, without wheel, average weight 1 cwt.	2	10	0

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 5*s*. extra.

HOWARD'S ANGLO-AMERICAN PLOUGH, MARKED A C.



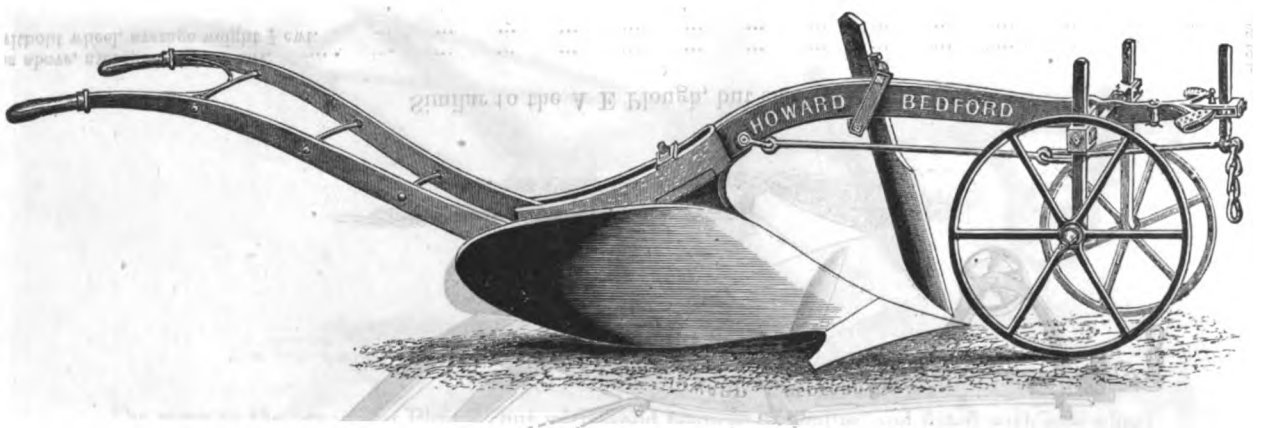
Similar to the A E Plough, but smaller.

	£	s.	d.
Price, as above, average weight 1 cwt.	2	7	6
Price, without wheel, average weight ¾ cwt.	2	2	6

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 5*s*. extra.

A B plough, similar to the above, but smaller and lighter, average weight ¾ cwt.	1	17	6
A B plough, without wheel, average weight ½ cwt.	1	12	6

HOWARD'S IRON ANGLO-AMERICAN PLOUGH, MARKED AG.



This is similar to the other Anglo-American Ploughs, but much stronger, and intended for extra deep ploughing.

	£	s.	d.
Price, with iron beam and handles	6	15	0

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 10s. extra.

The average weight of this Plough is 8½ cwt.

HOWARD'S PATENT WOOD PLOUGH, MARKED B W.

This is very similar to J. & F. Howard's Patent B plough, as shown on page 42, but fitted with wood beam and handles.

	£	s.	d.
Price, without wheels	2	15	0
Price, with one wheel	3	0	0
Price, with two wheels, as above	3	10	0

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 7*s.* 6*d.* extra. Steel side cap, 2*s.* 6*d.* extra.

The average weight of this plough is 2¼ cwt.

HOWARD'S ANGLO-AMERICAN DOUBLE-FURROW PLOUGH, MARKED AC.

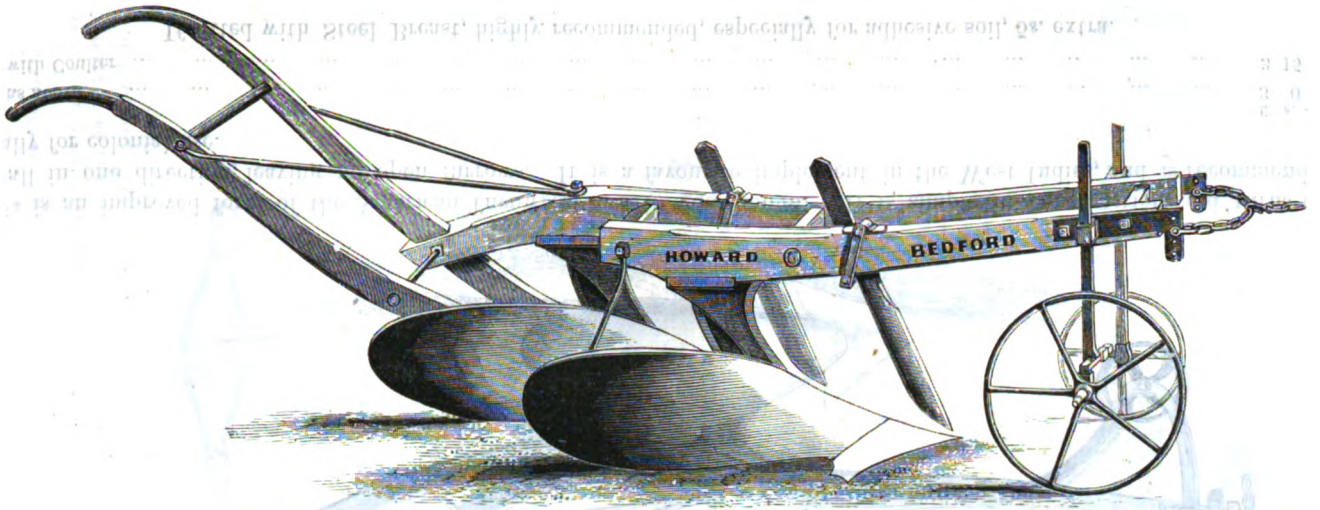
Similar to the A C Plough, but with iron beam and handles, and made to plough two furrows at a time.

	£	s.	d.
Price	6	6	0

If fitted with Steel Breasts, highly recommended, especially for adhesive soil, 10s. extra.

The average weight of this plough is 2¾ cwt.

HOWARD'S ANGLO-AMERICAN DOUBLE-FURROW PLOUGH, MARKED AD.



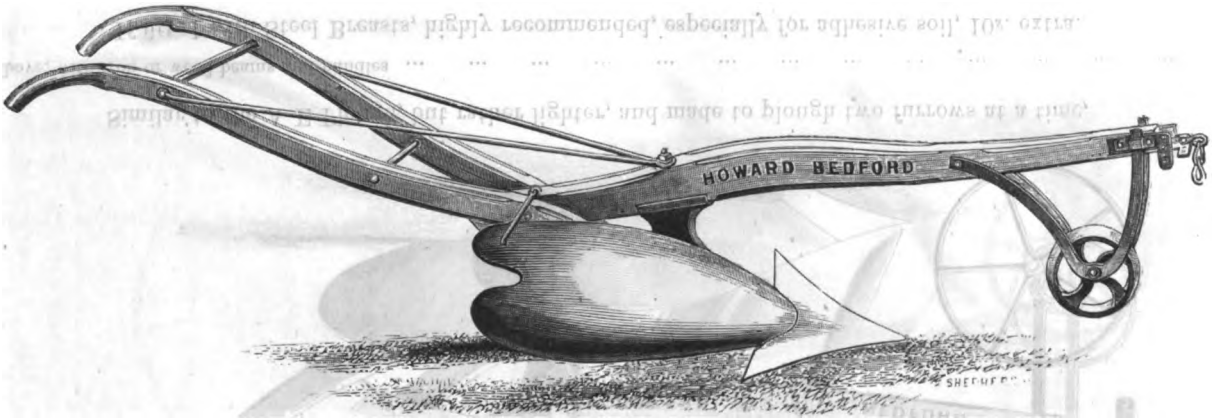
Similar to the A E Plough, but rather lighter, and made to plough two furrows at a time.

	£	s.	d.
Price, as above, with iron or wood beams and handles	6	15	0

If fitted with Steel Breasts, highly recommended, especially for adhesive soil, 10*s*. extra.

The average weight of this plough is 3 cwt.

HOWARD'S ANGLO-AMERICAN TURNWREST PLOUGH, MARKED TW.



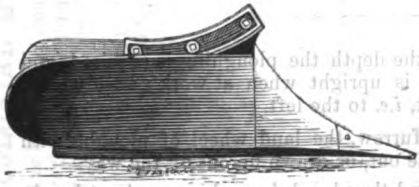
This is an improved form of the American Turnwrest or Hill-side Plough. It is simple in construction, and turns the land all in one direction, leaving no open furrows. It is a favourite implement in the West Indies, and is recommended specially for colonial use.

	£	s.	d.
Price, as above	3	0	0
Price, with Coulter	3	15	0

If fitted with Steel Breast, highly recommended, especially for adhesive soil, 5*s*. extra.

The average weight of this plough is 1½ cwt.

HOWARD'S IMPROVED RIDGING BODY.



HOWARD'S IMPROVED SUBSOIL BODY.

These Bodies can be attached to any of J. & F. Howard's ordinary iron ploughs.

	£	s.	d.
D ridging body, with iron breasts	0	18	0
D ridging body, with steel breasts	1	4	0
D D ridging body, with iron breasts	1	5	0
D D ridging body, with steel breasts	1	12	6
B,—B B,—H,—H H,—P,—P P,—S B, or L B, ridging body, with iron breasts	1	10	0
B,—B B,—H,—H H,—P,—P P,—S B, or L B, ridging body, with steel breasts	2	0	0
B,—B B,—H,—H H,—P, or P P, subsoil body	0	17	6

IMPROVED WROUGHT-IRON PLOUGH SLEDGE.

The above Sledge is fitted with high wheels, and will be found very useful for removing ploughs from one part of the farm to another. The wear of plough slades or soles, by sliding on the roads, is obviated, as well as the liability to strain. The breakages, which often take place in loading or unloading from carts, are also by its use avoided.

	£	s.	d.
Price	0	10	0

HOWARD'S DYNAMOMETER OR DRAUGHT GAUGE.

This is a simple Instrument for testing the draught of ploughs or other implements; one end is hooked to the plough, the other to the whippletree; as the horses draw, the spring is collapsed, and the power required is indicated on the dial.

	£	s.	d.
Price, with strong oak case, complete	3	3	0

A pair of ordinary farm horses, walking at the rate of 2½ miles an hour, will work a plough the resistance of which is about 3 cwt.

DIRECTIONS FOR USING HOWARD'S PLOUGHS.

1. The land wheel should be set to the depth the ploughing is required, and the furrow wheel so that the plough is upright when at work: both wheels ought to run slightly towards the work, *i.e.* to the left.

2. In ploughing the *mould* or last furrow, the land wheel of ploughs with No. 2 wheel fastenings is turned inside out, or drawn up out of the way.

3. When the wheels are taken off, and the plough is used as a swing plough, a share that is rather worn should be used, the lever neck fixed in the lowest grooves, and the draught chain lowered.

4. When ploughs with two wheels are used on narrow lands or stitches, the ridges should all be drawn out together, as well as the last furrow; the frequent alteration of the wheels will then be avoided.

5. Ploughs with two wheels should, in turning at land's end, be balanced on the furrow wheel.

6. In crossing tilths where it is cloddy, both wheels can be taken off, or the furrow wheel may be retained: the horses should be placed close to the plough, and the draught chain lowered.

7. On wet, sticky soil, where the land wheel clogs, a slide foot may be used instead of the wheel.

8. If ploughs run too much or too little to land, a piece of leather should be placed between the beam and frame, either round the front or hinder bolt, so as to throw the beam to the left or right as required.

9. In very hard land the horses should be placed about a yard farther from the plough, and the head or draught chain lowered, but not so much as to cause the plough to rise from the ground: this arrangement will prevent the breakage of the shares, by causing the plough to run level; the horses also from the same cause work more easily.

10. When the ground is hard or stony, a share with long point should be used, and as the point wears off the lever neck must be raised into the higher grooves.

11. On clay or soft land a share with short point should be used, and the lever neck fixed in the lower grooves; the head or draught chain should also be lowered, so as to prevent the wheels cutting into the ground.

12. On adhesive soils a steel breast and steel side cap will work cleaner than iron. Steel breasts can be sprung by the hinder stay so as to press the furrow more or less as required.

13. In putting on new breasts and other fittings, a turn should be given to one screw and then to another until all are tight,—*i.e.*, care should be taken not to screw one bolt tight until the other is nearly so: the width of the breast at the heel of the plough should be 8 or 8½ inches; in B B B and large ploughs, it should be 12 inches.

14. When a new breast is put on, a new slade should be put on also, or the plough will not stand level.

15. The skim coulter should be set so as only just to clear the herbage on the surface, the shallower the better; the hinder part should not be too high from the ground, but set as level as possible; in ploughing the *coming back* furrow, after drawing the first on the ridge, the skim coulter should be set moderately deep so as effectually to bury the grass.

16. A drag chain should be used when ploughing in green crops, stubbles, long dung, and on ley ground.

DIRECTIONS FOR USING HOWARD'S PLOUGHS. (FOR FOREIGN AND COLONIAL USE.)

Howard's Champion Ploughs are constructed so as to be drawn out at land's end by the draught animals, and not carried or lifted by the ploughman.

On reaching the end of the furrow the plough must not be carried or lifted by the ploughman to the next piece, but brought out by simply pressing on the handles, and so using them as a lever. The plough is thus turned over on the right hand side, balanced on the large or furrow wheel, *not the small or land wheel*, and so drawn towards the new piece. The turning can be done by a boy, and is more a matter of skill than of strength.

The breasts of Howard's Ploughs are all fixed on the right hand side, consequently they turn the furrow slice on the right hand side only. It is therefore necessary to work in ridges or lands, the width of which may be varied, according to the climate and nature of the soil, from 8 feet to 66 feet.

Perhaps the best mode of ploughing in dry climates with Howard's Ploughs is in 22 yard lands as described below:—

Step off from left hand boundary of field 22 yards, as shown in the above sketch. Divide this into two equal lengths of 11 yards each. Divide again that portion nearest the hedge or boundary into two equal lengths of 5½ yards. Upon the centre of this, marked A, throw a furrow slice from each side to form the ridge B. Keep ploughing round the ridge B till 5½ yards are done on each side, as shown on sketch. This first piece being finished, step out 22 yards from the middle of the ridge B; this distance will be 5½ yards beyond the first division of 22 yards, and its extremity forms the centre for the new ridge E. Proceed to make ridge E, and plough round it 5½ yards on each side as in the former case. There will then be 11 yards of unploughed land between the two ridges B and E, which proceed to plough out first on one side then on the other, until the work is finished in the middle, where there will be an open furrow S.

Now proceed to step out 22 yards from the ridge E, to get the centre for the new ridge F; make a ridge on F, and plough round it 5½ yards on each side as before, then 5½ yards on the right side of ridge E being already done, there will be 11 yards of unploughed land between the two ridges E and F, which plough out as before.

From F step out 22 yards to form the centre of another ridge, and so on until the field is finished.

If it should happen that an odd piece is left over on one side, a separate ridge must be made for it.

Where the fields are large, set out all the ridges first, so that several ploughs can work together in the same field.

Change the position of the ridges at every fresh ploughing, beginning the new ridges in the old furrows.

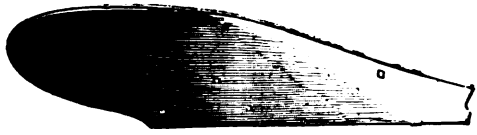
The land or small wheel regulates the depth, the furrow or large wheel the width of the furrow slice. These wheels should be set so that the plough is upright when at work; the small wheel, raised according to the depth, running on the land, the large wheel running in the furrow.

The draught chain can be shifted at the plough head, up or down, right side or left side, as may be required.

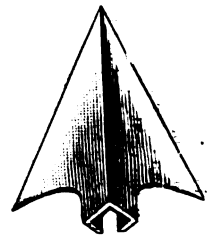
These Directions can be had in Foreign Languages.

HOWARD'S PLOUGH FITTINGS.

Breast.

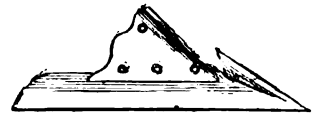


Triangular Share.

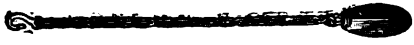


Slade.

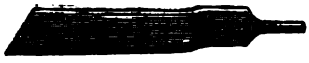
Paring Share, with steel blade, for grass land.



Drag Chain, for ploughing-in stubble, &c.

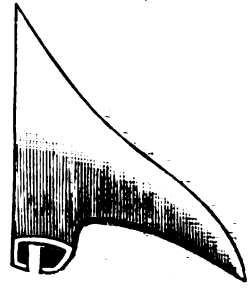


Furrow Presser, to fix on breast of Kent Plough, or for hilly land.

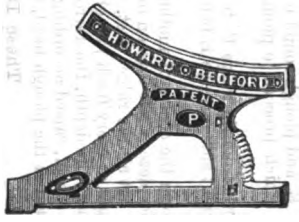


Slide Foot, used in place of land wheel during wet weather on clay land.

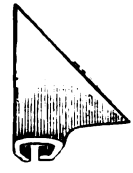
Paring Share for stubbles. Either wrought or cast iron.



Frame.



Share.
Made in various widths and shapes.



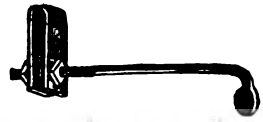
Lever Neck, or Share.

HOWARD'S PLOUGH FITTINGS—(continued).

Rest.

Wrought Coulter Clip.

Breast Stay.



Coulter Stay, to be put on when Ploughing among roots, &c.

Furrow Wheel Slide.

Breast Coupling.

Skim Coulter Neck and Share.

Land Wheel Slide.

Frame Coupling.

Share Hook.

Front Wheel Cap.

Coulter Loop Screw.

Side Cap.

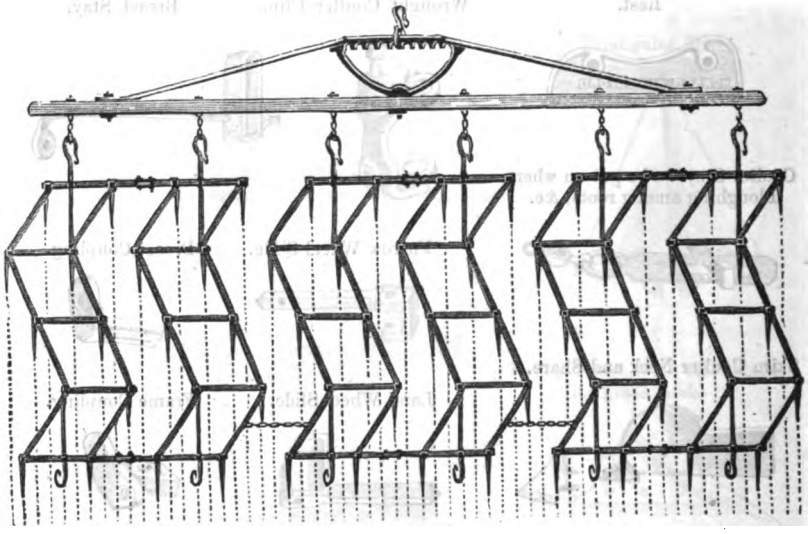
Back Wheel Cap.

Wheel Loop Screws.

J. & F. HOWARD continue to pay the utmost attention to the wearing parts of their Ploughs, and would recommend those who use their Implements not to purchase any Castings, unless known to be of their manufacture and MARKED WITH THEIR NAME, or they cannot be held responsible either for their fitting or wearing properly.

J. & F. HOWARD strongly recommend those who use their Ploughs to send them to their Manufactory when requiring a thorough repair.

HOWARD'S PATENT JOINTED ZIGZAG IRON HARROWS.



FIFTY-FIVE THOUSAND Sets of the above are in use.

At the last Great Trials of the Royal Agricultural Society of England, held at Leicester, 1868, J. & F. Howard gained

THE FIRST PRIZE FOR THE BEST HARROWS;

AND EVER SINCE 1856,

J. & F. Howard have won

EVERY FIRST PRIZE for Harrows in EVERY CLASS, both for Steam and Horse Power.

J. & F. Howard have received altogether from the Royal Agricultural Society of England,

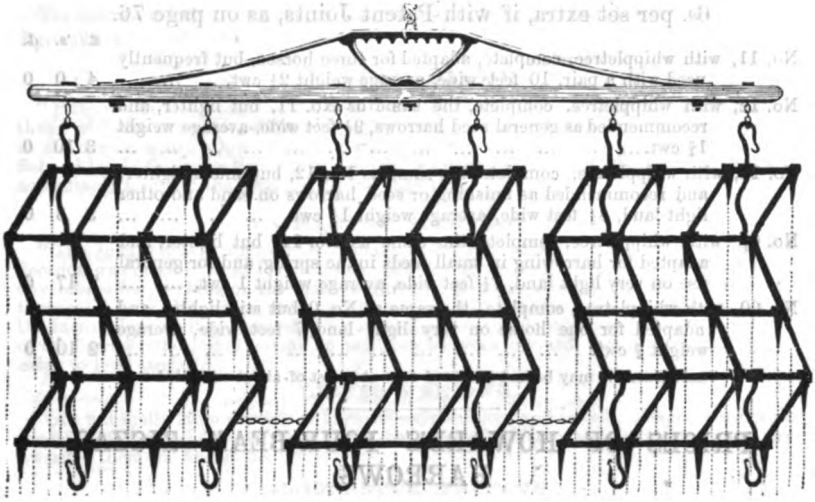
EIGHTEEN FIRST PRIZES for the BEST HARROWS,

being the largest number of Prizes awarded to any kind of Harrows ever exhibited.

These Harrows are the same in principle as those shown on the following page, but are furnished with joints in the centre of each Harrow, which allow them to adapt themselves to the form of the ridges or any unevenness of the surface; by a simple arrangement, these joints may be instantly locked, or allowed as much play as required.

In very rough work the joints should be fastened.

HOWARD'S PATENT ZIGZAG IRON HARROWS.



Howard's Zigzag Harrows are simple, strong, and durable, and thoroughly adapted for every description of work.

The teeth in all J. & F. Howard's Harrows are fitted into the frames in a simple and secure manner, and by means of a stop or guard the nuts are prevented from shaking loose; when thus fitted, the Harrow is as firm as if all parts were welded together, and not more liable to shake loose. The teeth are so placed that each cuts a separate track at equal distances. The draught being central is also of great advantage; the irregular pace of the horses does not affect their working, as is the case when they draw from each end of the whippletree.

Each Harrow is attached to the whippletree by double hooks, which prevent them, in rough work and turning, from *riding* on each other, and also when working upon the side of a hill, from inclining toward the lower ground. They are furnished with hooks at the hinder part, in order to draw them the contrary way when harrowing in seeds or spring crops; by this means the soil is not rooted up or penetrated so deeply as when they are drawn forward in the usual way.

PRICES OF HOWARD'S FOUR-BEAM ZIGZAG HARROWS,

containing 60 Teeth in the set of three, and placed in 5 rows.

6*s.* per set extra, if with Patent Joints, as on page 76.

	£	*s.*	*d.*
No. 11, with whippletree, complete, adapted for three horses, but frequently used with a pair, 10 feet wide, average weight 2¼ cwt.	4	0	0
No. 12, with whippletree, complete, the same as No. 11, but lighter, and recommended as general seed harrows, 9¼ feet wide, average weight 1¾ cwt.	3	10	0
No. 14, with whippletree, complete, the same as No. 12, but much lighter, and recommended as finishing or seed harrows on sand and other light land, 8¼ feet wide, average weight 1¼ cwt.	3	3	0
No. 0, with whippletree, complete, the same as No. 14, but lighter, and adapted for harrowing in small seeds in the spring, and for general use on very light land, 7¼ feet wide, average weight 1 cwt.	2	17	6
No. 00, with whippletree, complete, the same as No. 0, but still lighter, and adapted for one horse on very light land, 7 feet wide, average weight ¾ cwt.	2	10	0

These Harrows may be had in sets of four at a cost of about one-third more.

PRICES OF HOWARD'S FOUR-BEAM ZIGZAG HARROWS,

containing 72 Teeth in the set of three, and placed in 6 rows.

6*s.* per set extra, if with Patent Joints, as on page 76.

	£	*s.*	*d.*
No. 10, with whippletree, complete, adapted for three horses, 10¼ feet wide, average weight 2¾ cwt.	5	0	0
No. 13, with whippletree, complete, the same as No. 10, but lighter, and adapted for a pair of horses, 9¼ feet wide, average weight 1¾ cwt.	4	0	0
No. 15, with whippletree, complete, similar to No. 13, but much lighter, and highly recommended as seed harrows, 8¼ feet wide, average weight 1¼ cwt.	3	6	0

These Harrows may be had in sets of four at a cost of about one-third more.

PRICES OF HOWARD'S THREE-BEAM ZIGZAG HARROWS,

containing 45 Teeth in the set of three, and placed in 5 rows.

	£	*s.*	*d.*
No. 11, with whippletree, complete, the same strength as the 4-beam No. 11, but suitable for a pair of horses, 7¼ feet wide, average weight 1¾ cwt.	3	10	0
No. 12, with whippletree, complete, the same strength as the 4-beam No. 12, but lighter, 7¼ feet wide, average weight 1¼ cwt.	3	2	6

PRICES OF HOWARD'S THREE-BEAM ZIGZAG HARROWS,

containing 54 Teeth in the set of three, and placed in 6 rows.

	£	*s.*	*d.*
No. 10, with whippletree, complete, the same strength as the 4-beam No. 10, but more adapted for land of uneven surface, 8 feet wide, average weight 2¼ cwt.	4	0	0
If with four Harrows to the set, containing 72 teeth, 10¼ feet wide, average weight 2¾ cwt.	5	5	0

HOWARD'S PATENT ZIGZAG HARROWS.

The following Judges' Reports on Harrows have appeared in the *Journal* of the Royal Agricultural Society of England:—

YORK MEETING.

"Fifteen sets were selected for trial. We saw no material improvement in any of them, with the exception of a set brought out by Messrs. HOWARD. These have joints in the centre, which allow them to work on uneven land almost as well as where it is flat and level; this invention, though simple, we considered a valuable improvement, and accordingly awarded the prize to Messrs. HOWARD."

EXETER MEETING.

"The Judges highly approved of Messrs. HOWARD'S patent jointed harrows, and the decision was given in their favour; they consider these harrows better calculated than any others for working on the sides of furrows, &c., and strongly recommend them to those who have their crops sown on the narrow *stitch*, as they cling round the edge of the furrow, leaving it pulverized in a convex form, at the same time searching the bottom of the furrow; the joints having no tendency to work upward, they are equally applicable to level lands."

LEWES MEETING.

"An unusually large number of harrows were selected and tested. Messrs. HOWARD'S accomplished admirably all that could be expected of harrows to perform, and we awarded them the first prize."

GLOUCESTER MEETING.

"Messrs. HOWARD'S jointed harrows adapted themselves admirably to the unevenness of the land, while they can be made fast for level ground if requisite. We awarded them the first prize."

CARLISLE MEETING.

"The harrows were tried upon ridge or furrow lands; those by Messrs. HOWARD, jointed near the ends, were admirably adapted for these inequalities of surface, and made excellent work; their being no prize offered, we highly commended the harrows of Messrs. HOWARD."

CHELMSFORD MEETING.

"Messrs. HOWARD'S harrows covered their ground well, cut deeply, and might be worked either way: they have a simple contrivance of hoop iron under the nut to keep it in place; the price of them is moderate, the form is peculiar, and, being jointed in the centre, they suit round stitches as well as flat lands. The first prize was therefore awarded to Messrs. HOWARD for their light harrows, the first prize for their general purpose harrows, and the first prize for their heavy or drag harrows."

WARWICK MEETING.

"*Harrows for light land.*—These were tried on land that had been previously ploughed, and which was a very good test. Some made very indifferent work; in fact, it would be impossible for a greater difference to be shown in the work done. We awarded to Messrs. HOWARD the first and the second prizes."

NEWCASTLE MEETING.

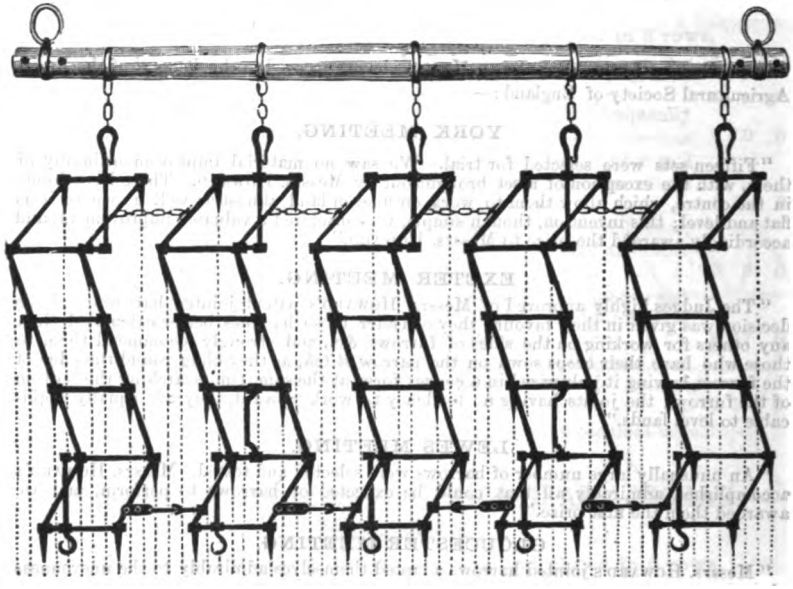
"*Harrows.*—The large number and the great variety of these implements render it impossible fully to discuss in detail, in this report, the merits of their different modes of construction; several among them, although not mentioned in our awards, are well deserving of notice, and would prove very useful on suitable land. It being our duty to consider what implements were best adapted to the country at large, we award three prizes of £8, £7, and £5 to Messrs. J. & F. HOWARD for their three sizes of harrows." These were the only prizes awarded.

LEICESTER MEETING, 1868.

Harrows.—"Having well considered the merits of the different implements, we came to the conclusion that Messrs. HOWARD still maintain their position in this class, and are entitled to the First Prize of £13."

The above is the last Report issued by the Society.

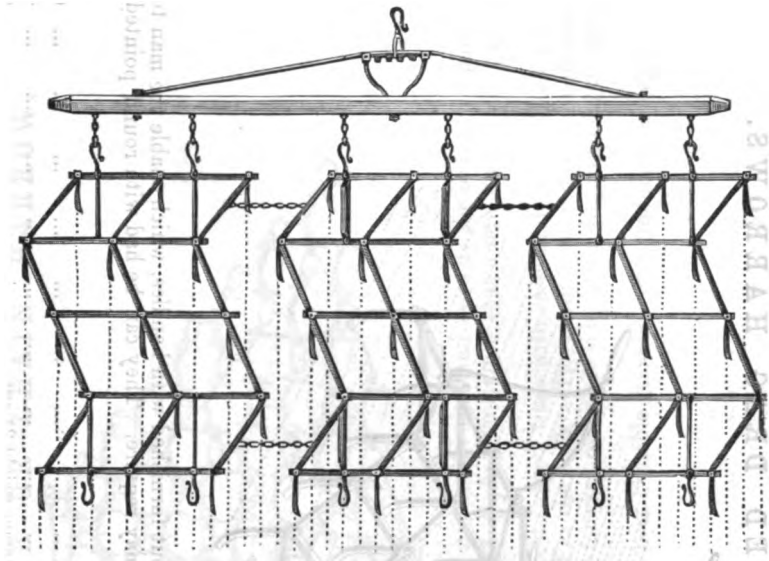
HOWARD'S PATENT TWO-BEAM ZIGZAG HARROWS.



These Harrows are adapted for land ploughed in small *stitches* of eight, ten, or twelve furrows. Each of the Harrows having but two beams, they adapt themselves to the shape of the ridge, and fall into the furrows better than wider Harrows. The couplings are made with an improved joint, which preserves the relative distance of the Harrows.

	£	s.	d
No. 18, with whippletree, complete, 4 Harrows to the set, adapted for 8-furrow stitches, 7½ feet wide, average weight 2 cwt.	4	5	0
No. 18, with whippletree, complete, 5 Harrows to the set, for 10-furrow stitches, 9½ feet wide, average weight 2½ cwt.	5	0	0
No. 18, with whippletree, complete, 6 Harrows to the set, for 12-furrow stitches, 11 feet wide, average weight 3 cwt.	5	15	0
No. 19, with whippletree, complete, 5 Harrows to the set, similar to No. 18, but rather lighter, 7½ feet wide, average weight 2 cwt. ...	4	5	0
No. 19, with whippletree, complete, 6 Harrows to the set, for 10-furrow stitches, 9½ feet wide, average weight 2½ cwt.	5	0	0
No. 19, with whippletree, complete, 7 Harrows to the set, for 12-furrow stitches, 11 feet wide, average weight 2¾ cwt.	5	15	0
No. 20, with whippletree, complete, 5 Harrows to the set, upon the same principle as Nos. 18 and 19, but of smaller size, and adapted for light land, 7½ feet wide, average weight 1¾ cwt.	3	16	0
No. 20, with whippletree, complete, 6 Harrows to the set, for 10-furrow stitches, 9½ feet wide, average weight 2 cwt.	4	8	0
No. 20, with whippletree, complete, 7 Harrows to the set, for 12-furrow stitches, 11 feet wide, average weight 2½ cwt.	5	0	0
No. 21, with whippletree, complete, 5 Harrows to the set, similar to No. 20, but rather smaller, and adapted for very light land, 7½ feet wide, average weight 1½ cwt.	3	5	0
No. 21, with whippletree, complete, 6 Harrows to the set, for 10-furrow stitches, 9½ feet wide, average weight 1¾ cwt.	3	17	6
No. 21, with whippletree, complete, 7 Harrows to the set, for 12-furrow stitches, 11 feet wide, average weight 2 cwt.	4	10	0

HOWARD'S PATENT ZIGZAG DRAG HARROWS.



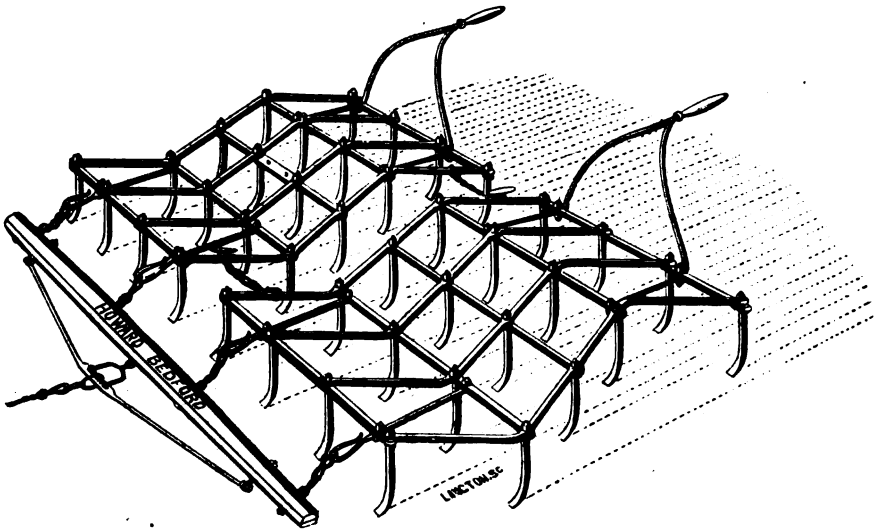
Ever since 1856, J. & F. Howard have received from the Royal Agricultural Society of England
ALL the FIRST PRIZES for the BEST DRAG HARROWS.

The above are made upon the same principle as those previously described, but are much larger and stronger. They are made with long curved teeth, and are intended as a substitute for the heavy wooden framed drag Harrows. They can be used with three or four horses on rough fallows, and are made to draw backward or forward.

These Harrows are often used instead of Scarifiers, and for a good deal of work are found more efficient.

	£	s.	d.
No. 16, with whippletree, complete, 2 Harrows to the set, 7½ feet wide, teeth 12 inches long, average weight 2¾ cwt.	5	15	0
No. 17, with whippletree, complete, 3 Harrows to the set, upon the same principle as No. 16, but lighter, and made to cover more ground, 10½ feet wide, teeth 10 inches long, average weight 3¼ cwt. ...	6	6	0
No. 18, with whippletree, complete, 3 Harrows to the set, similar to No. 17, but much lighter, 9 feet wide, teeth 9 inches long, average weight 2½ cwt.	4	15	0

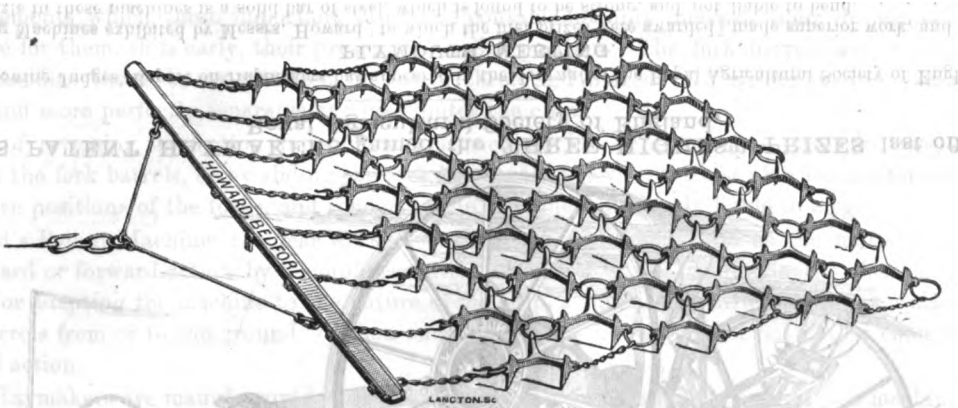
HOWARD'S PATENT HANDLED DRAG HARROWS.



These are the same as J. & F. Howard's ordinary Drag Harrows, but furnished with handles, which enable the man to press the tines into the ground, or lift them up to clear them, as occasion may require. They can be had with round pointed teeth as well as with the chisel-shaped teeth shown above.

	£	s.	d.
H 16, 3-beam with whippletree, complete, average weight 3 cwt.	6	6	0
H 17, 3-beam with whippletree, complete, average weight 2 cwt.	4	15	0
H 17, 4-beam with whippletree, complete, (recommended as the most useful size,) average weight 2¾ cwt.	6	6	0

HOWARD'S PATENT FLEXIBLE OR CHAIN HARROW.



This Patent Harrow is much more durable, and will do as much in going over the land once as the ordinary Chain Harrow will do in three times. It is not liable to derangement, and its construction is so simple that a new link can be put into the Harrow in the field.

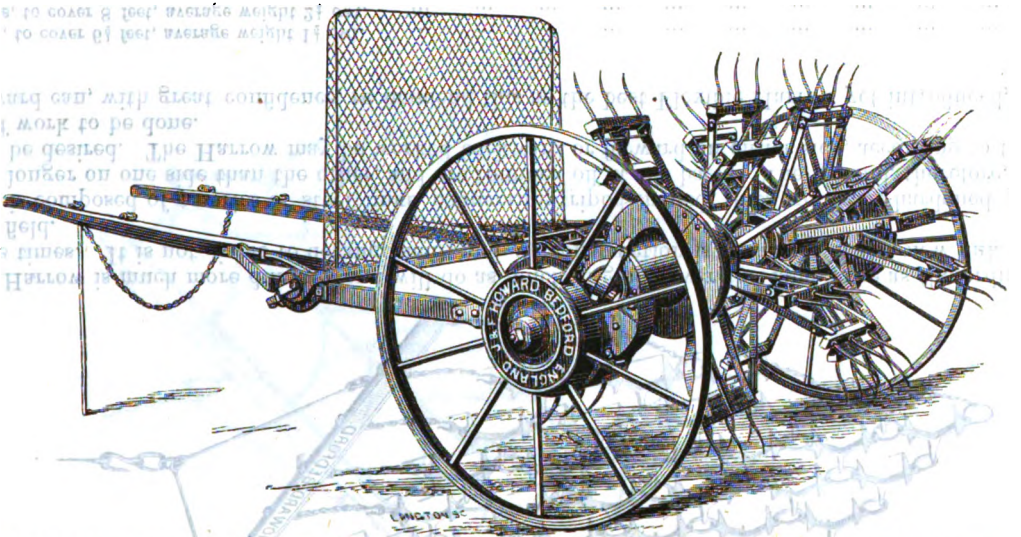
The Harrow is composed of a series of steel links, connecting tripod-shaped tines with case-hardened points on each side. The points are longer on one side than the other, and are rounded off at the back. The ground, therefore, is penetrated more or less, as may be desired. The Harrow may be worked backward or forward on either side, according to the state of the land and the kind of work to be done.

J. & F. Howard can, with great confidence, recommend this as the best Flexible Harrow yet introduced, especially for grass land.

F 2

	£	s.	d.
F 1, for one horse, to cover 6½ feet, average weight 1½ cwt.	2	15	0
F 2, for two horses, to cover 8 feet, average weight 2¼ cwt.	4	0	0

HOWARD'S PATENT DOUBLE-ACTION HAYMAKER.



HOWARD'S PATENT HAYMAKERS gained the THREE HIGHEST PRIZES last offered by the Royal Agricultural Society of England.

The following Judges' Report on Haymakers has appeared in the *Journal* of the Royal Agricultural Society of England:—

PLYMOUTH MEETING.

"The two Haymaking Machines exhibited by Messrs. Howard [to which the first prizes were awarded] made superior work, and are strong clever implements. . . . The axle in these machines is a solid bar of steel, which is found to be strong, and not liable to bend. . . . The form of the tines is good. The forward action effects a complete separation of the grass, and the back action leaves the crop light and loose."

The above is the last Report issued by the Society.

J. & F. HOWARD direct special attention to their PATENT HAYMAKERS, which have been thoroughly tested, and in which important improvements, suggested by several years' experience, have been introduced.

The many improvements which these important Machines contain, not only increase their durability and efficiency but have tended to secure for them, thus early, their present unrivalled position. The fork barrels are so arranged as to render clogging all but impossible: the forks are mounted in sets of three, and placed in a zigzag position, an arrangement which equalizes the work, and more perfectly separates and distributes the crop.

The usual method of reversing the motion in double-action machines has hitherto been—either by loose sliding pinions by means of clutches on the fork barrels, or by sliding the fork barrels themselves; the last plan having the obvious disadvantage of altering the relative positions of the forks, and rendering the machine continually liable to clog.

In J. & F. Howard's Patent Machines the gear work is both strong and simple, and as the motion can be changed in an instant to the backward or forward action by a simple eccentric movement of the main axle, the disadvantages alluded to are entirely obviated. For adapting the machine to the nature of the crop, a similar eccentric movement is also used for raising or lowering the fork barrels from or to the ground. When once set for the forward action no further change is required to use it with the backward action.

The New Patent Haymakers are manufactured with the greatest care; and as every part of the machine liable to strain is made of wrought or malleable iron, they may safely be removed any distance without fear of breakage, and without the necessity of taking them to pieces.

For Continental use, J. & F. Howard's Machines can be fitted with pole instead of shafts, without extra charge.

For very narrow roads, any of J. & F. Howard's Haymakers may be had narrower than usual.

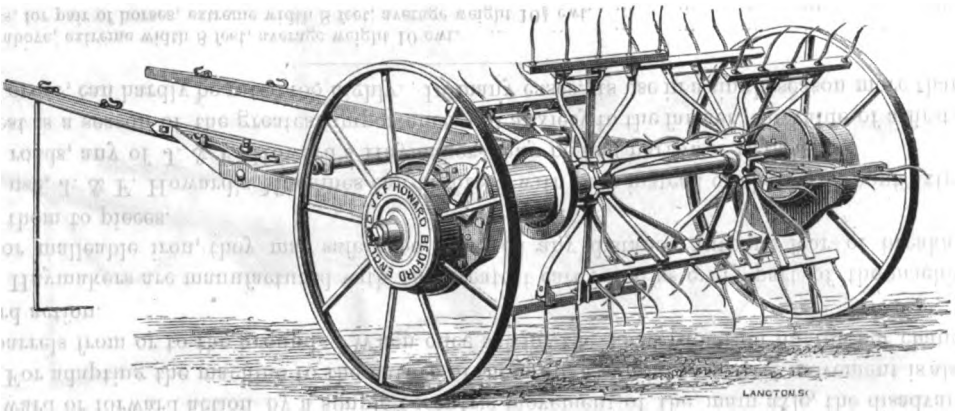
As the hay harvest is a season of the greatest importance and anxiety to the farmer, the value of a first-class Haymaker, not liable to get out of order, can hardly be rated too highly. In many cases, its use in a single season more than repays its cost.

	£	s.	d.
H H, for one horse, as above, extreme width 8 feet, average weight 10 cwt.	15	15	0
H H, with double shafts, for pair of horses, extreme width 8 feet, average weight 10½ cwt.	16	16	0

If with Patent Wire Screen, as shown above, to prevent the grass lodging on the front, 12s. 6d. extra.

J. & F. Howard recommend this machine as the most useful size, being equal to the heaviest crops.

HOWARD'S PATENT DOUBLE-ACTION HAYMAKER FOR SMALL OCCUPATIONS.



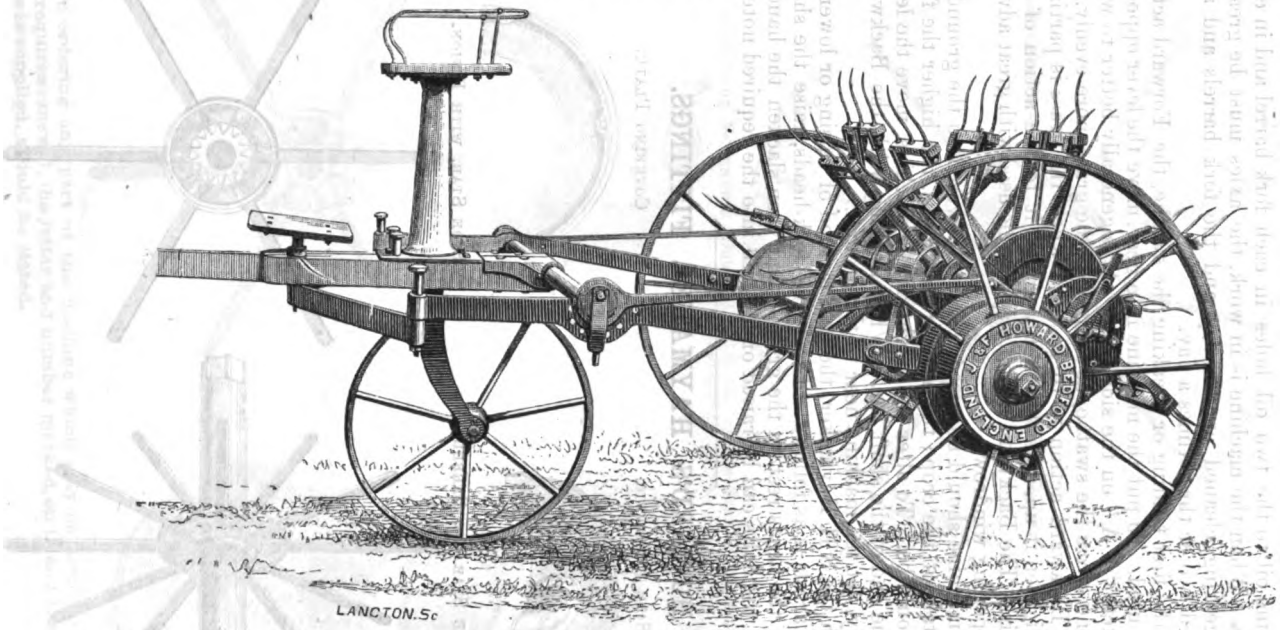
HOWARD'S PATENT HAYMAKERS gained the THREE HIGHEST PRIZES last offered by the Royal Agricultural Society of England.

This Machine is similar in construction to the H H, but lighter, and although adapted for most crops, the larger machine is recommended for heavy crops. It has the double-action, and the same gearing and patent eccentric motion for reversing the action of the fork barrels as the H H.

	£	s.	d.
S H, extreme width 7½ feet, average weight 7½ cwt.	12	12	0
H, a similar machine, but with eccentric movement for lowering forks, extreme width 7½ feet, average weight 8 cwt.	13	13	0

If with Patent Wire Screen, to prevent the grass lodging on the front, 12*s.* 6*d.* extra.

HOWARD'S PATENT DOUBLE-ACTION HAYMAKER FOR TWO HORSES.



HOWARD'S PATENT HAYMAKERS gained the **THREE HIGHEST PRIZES** last offered by the Royal Agricultural Society of England.

	£	s.	d.
H H H, as above, with front wheel and pole for two horses and seat for driver, extreme width 8 feet, average weight 12 cwt.	18	18	0

If with Patent Wire Screen, to prevent the grass lodging on the front, 12*s.* 6*d.* extra.

DIRECTIONS FOR USING HOWARD'S HAYMAKERS.

1. To prepare the machine for work, take off the travelling wheels, grease the axles, see that the gearing is clean, and supply a little of the *best* machine oil to the two oil holes in each fork barrel and in each side plate. When the machine is in work, the axles must be greased and the gearing cleaned once a day, and the fork barrels and side plates oiled two or three times a day.

2. For the first tedding or breaking the swathe, the Forward action should be used. To put the machine into gear, move the lever opposite to the letters "F A" on the side plate. It is generally better to work the machine *across* the swathe, as it spreads the grass more evenly.

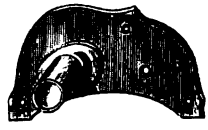
3. The Backward action is to be used when the grass is partially dried, to lighten it up, and thoroughly expose it to the action of the sun and air. The Backward action may also be used with great advantage for opening windrows.

4. The machine should be raised from and lowered to the ground to suit the state of the crop; the heavier the crop is, the higher the fork barrels should be. To alter the height of the machine, move the lever fixed to the end of the shaft bar. When working with the Backward action only, set the machine near to the ground.

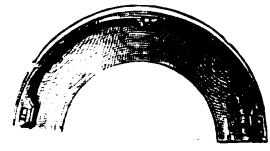
5. With the S H Haymaker, the best method of raising or lowering the fork barrels is as follows:—Close the fork-heads, raise the shafts gently till the heads rest on the ground, and then slacken the handle-nuts until the bolts can be raised or lowered into the required notch.

HOWARD'S HAYMAKER FITTINGS.

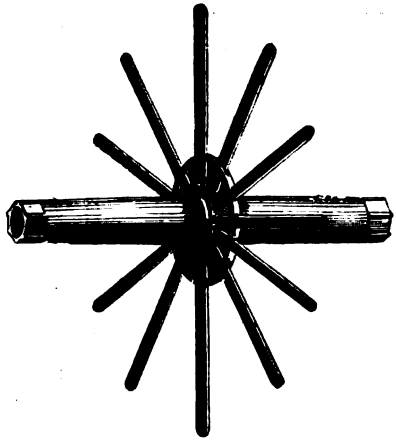
Off Side Eccentric.



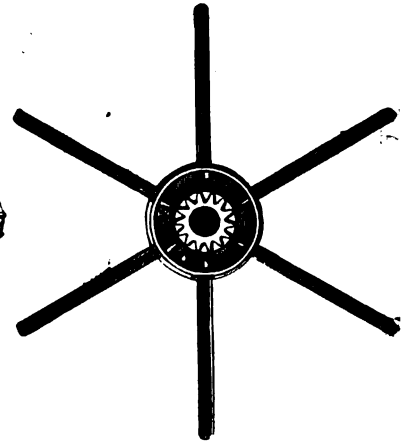
Covering Plate.



Centre Star and Barrel.



Side Star, with Pinion.



HOWARD'S HAYMAKER FITTINGS—(continued).

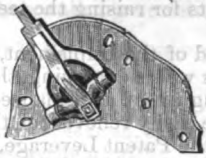
WHEEL.

FORK HEAD CASTING for Spring.

FORK HEAD CASTING.

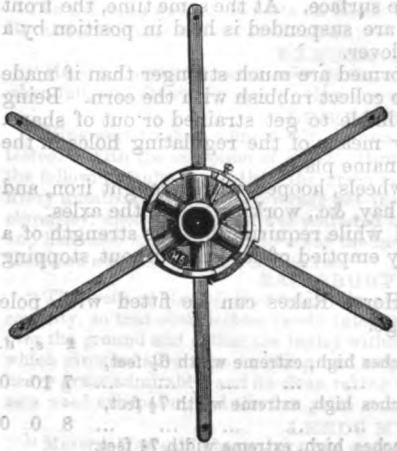
LOOSE PINION.

NEAR SIDE ECCENTRIC (Outside).

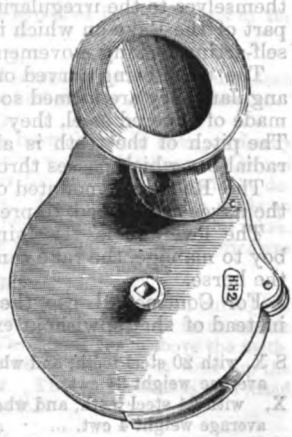


NEAR SIDE ECCENTRIC (Inside).

SIDE STAR.

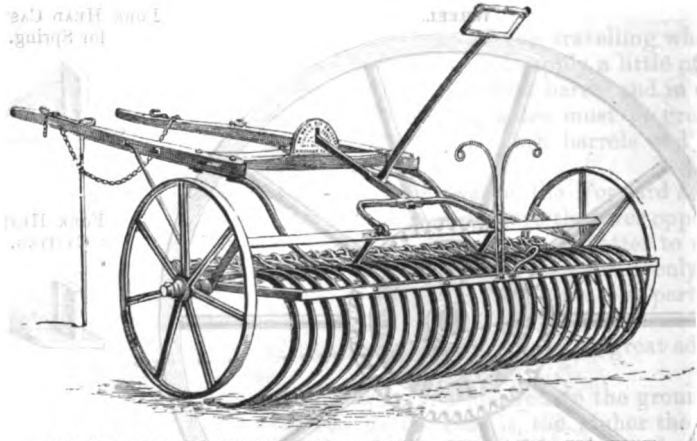


WHEEL BOX.



In ordering any part of the machine which may be accidentally broken or requires renewal, the letter and number marked on it, and the year when it was supplied, should be stated.

HOWARD'S NEW PATENT HORSE RAKES.



MORE THAN SIXTEEN THOUSAND ARE IN USE.

Ever since 1852, J. & F. HOWARD have won EVERY FIRST PRIZE offered by the Royal Agricultural Society of England for HORSE RAKES.

J. & F. Howard's New Patent Horse Rakes have several advantages over their former patterns, in the arrangements for raising the teeth and in the delivery of the crop.

A central axle of steel runs from end to end of the Implement, to which the drawing shafts are attached. The axle, as well as carrying the wheels, forms a fulcrum on which the teeth when being raised are balanced, and by this action the teeth when emptying are more easily relieved of their load.

By a new and very simple arrangement of the Patent Leverage, the teeth when in work are raised above the central axle, and are thus left free to adapt themselves to the irregularities of the surface. At the same time, the front part of the Rake on which the teeth are suspended is held in position by a self-acting locking movement of the lever.

The teeth being curved or sickle-formed are much stronger than if made angular; they are formed so as not to collect rubbish with the corn. Being made of tapered steel, they are not liable to get strained or out of shape. The pitch of the teeth is altered by means of the regulating holes in the radial bar which passes through the name plate.

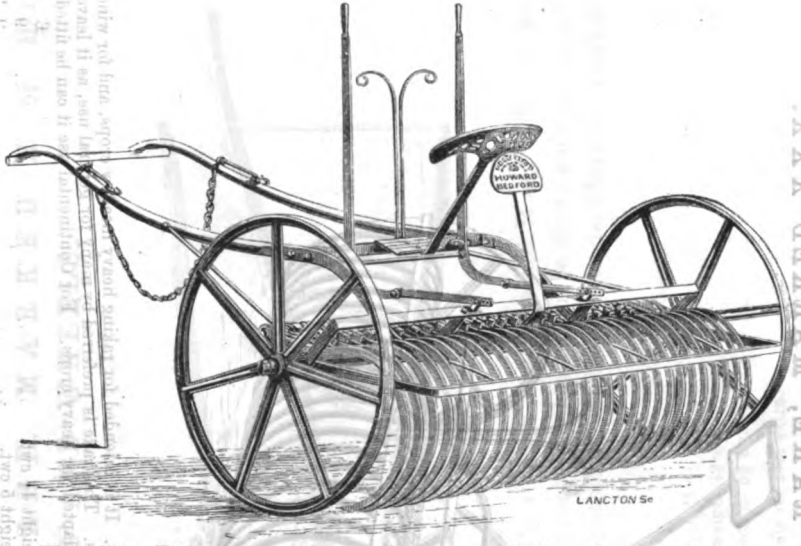
The Rakes are mounted on high wheels, hooped with wrought iron, and the naves are capped, to prevent the hay, &c., working round the axles.

The leverage is very simple, and while requiring but the strength of a boy to manage, the rake can be easily emptied of its load without stopping the horse.

For Continental use, the above Horse Rakes can be fitted with pole instead of shafts, without extra charge.

	£	s.	d.
S X, with 20 steel teeth, and wheels 32 inches high, extreme width 6½ feet, average weight 3½ cwt.	7	10	0
X, with 24 steel teeth, and wheels 32 inches high, extreme width 7½ feet, average weight 4 cwt.	8	0	0
X X, with 24 steel teeth, and wheels 36 inches high, extreme width 7½ feet, average weight, 4½ cwt.	8	7	6
X X, with 28 steel teeth, and wheels 36 inches high, extreme width 8½ feet (recommended as the most useful size), average weight 4½ cwt.	8	15	0

HOWARD'S HORSE RAKE WITH SEAT.



The above Rakes are similar to those described on the opposite page, but are fitted with seat for driver, and suitable leverage for emptying the load. The leverage is very simple, and can be worked by the man either when walking or riding.

	£	s.	d.
S, with 24 steel teeth, and wheels 32 inches high, extreme width 7½ feet, average weight 4 cwt.	8	10	0
S S, with 28 steel teeth, and wheels 36 inches high, extreme width 8½ feet, average weight 4½ cwt.	9	5	0
S S S, with 28 steel teeth, and wheels 42 inches high, extreme width 8½ feet, average weight 5 cwt.	10	5	0

The following Judges' Reports on Horse Rakes have appeared in the *Journal* of the Royal Agricultural Society of England:—

EXETER MEETING.

"Messrs. HOWARD's horse rake performed its work exceedingly well—raking clean when full, and littering none; we therefore awarded the first prize to Messrs. HOWARD."

LEWES MEETING.

"Nine were tried on some newly cut grass where the haymakers had been previously tested. With the exception of Messrs. HOWARD's, they were all liable to one or two of the following faults—viz., that the grass collected was too much compressed, the delivery unsatisfactory, or the leverage not instantaneous. A second trial was made on clover-ley, upon which straw was scattered in order to test their merits as stubble rakes, and here also Messrs. HOWARD's was the most effective implement. The first prize was therefore awarded to Messrs. HOWARD."

SALISBURY MEETING.

"The teeth of Messrs. HOWARD's rake are made of steel, of great length, curve, and capacity, so that obstructions rarely interfere, and they can be adjusted so as to ride over the ground and gather the barley without soil. The lifting bar is above the teeth, which gives an advantage in filling and emptying. It takes 7½ feet; it drew up the heavy grass admirably, and its clean raking was perfect. This implement is also fitted as a weed extirpator, and the first prize was awarded to it."

LEEDS MEETING.

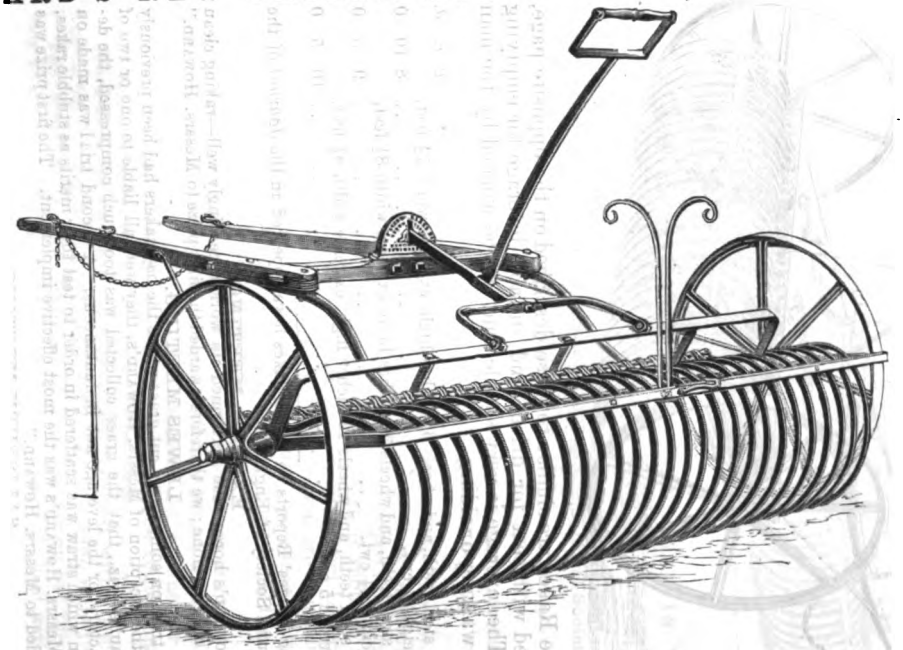
"Messrs. HOWARD's horse rake was superior to any exhibited, and received the prize of ten pounds."

PLYMOUTH MEETING.

"The entry of horse rakes was large; but Messrs. HOWARD's were so manifestly superior that the decision as to the first prize was a very simple business."

Th above is the last Report issued by the Society.

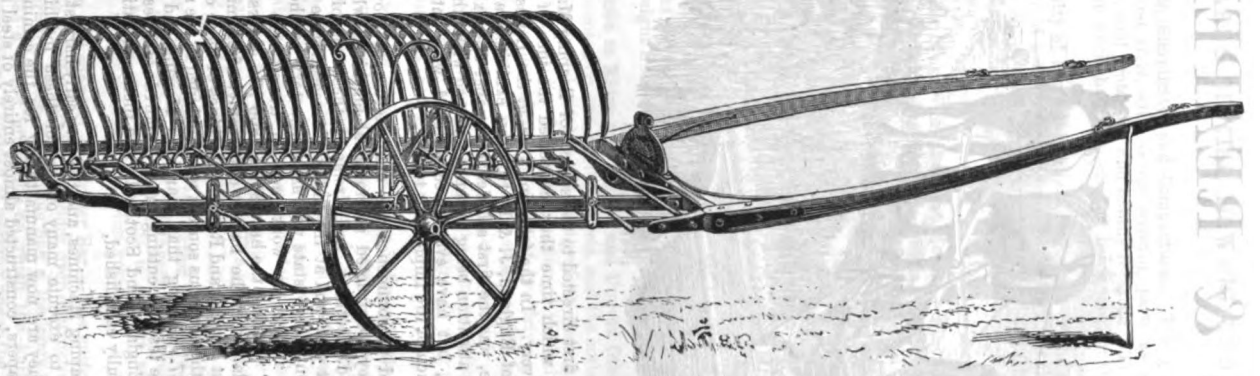
HOWARD'S NEW PATENT HORSE RAKE, MARKED XXX.



This is a larger Rake than those described on page 90, and is fitted with higher wheels. It is intended for raking heavy meadow crops, and for windrowing; but as it is within the power of one man, it may also be used for general purposes. This rake is preferred by many for general use, as it leaves the hay and corn in a looser or less compressed state than the smaller sizes, and is better adapted for heavy crops. For Continental use it can be fitted with pole instead of shafts without extra charge.

	£	s.	d.
X X X, with 24 steel teeth, and wheels 42 inches high, extreme width 7½ feet, average weight 4¼ cwt.	9	7	6
X X X, with 28 steel teeth, and wheels 42 inches high, extreme width 8¼ feet, average weight 5 cwt.	9	15	0

HOWARD'S PATENT HORSE RAKE, MARKED H or H H, WITH MOVEABLE SHAFTS AND WHEELS.



The above is the same in principle as J. & F. Howard's original Prize Horse Rakes, marked H and H H, but made so that the shafts can be readily moved to the end of the rake, by which means the implement can be drawn endwise through any gateway, or along very narrow roads. It is well adapted for Wales, and other mountainous districts, where the roads are too narrow for the ordinary horse rake.

		£	s.	d.
H,	with 24 steel teeth, and wheels 32 inches high, extreme width 7½ feet, average weight 4½ cwt.	8	5	0
H H,	with 28 steel teeth, and wheels 32 inches high, extreme width 8½ feet, average weight 4¾ cwt.	8	15	0
H H H,	with 24 steel teeth, and wheels 36 inches high, extreme width 8½ feet, average weight 5¾ cwt.	10	10	0

If with Moveable Shafts and Wheels, as above, 15*s.* extra.

HOWARD'S

PATENT BRITISH

MOWERS & REAPERS.

J. & F. HOWARD'S attention was first directed to the subject of Reaping Machines at the Great Exhibition of 1851, at which time they conceived the idea of making a machine with a self-acting side delivery. In the following year, at the Lewes meeting of the Royal Agricultural Society of England, J. & F. HOWARD exhibited a machine on this principle; this, they believe, was the first self-delivery reaper ever exhibited in England. Owing, however, to their attention being so much engaged with other implements, they put aside this reaper, but have ever since watched with interest the development of so important a branch of the implement trade.

In 1866 J. & F. HOWARD decided to commence the manufacture of Mowing and Reaping Machines; to this end they constructed several trial machines, which were sent to different parts of England, Scotland, and Ireland: these machines were worked during the harvest of that year, and at the end of the season were returned to the manufactory for examination: their state was as satisfactory as the reports of the users were encouraging; neither in work nor in transit was either of these machines broken or injured. During the harvest of 1866 Mr. JAMES HOWARD visited the United States and Canada, where he had an opportunity of examining and comparing the working of all the best Mowing and Reaping Machines of those countries; the valuable experience gained from these various sources was combined in the machines constructed for the harvest of 1867. During that year both Mowing and Reaping Machines were subject to very severe tests in cutting many hundreds of acres under a variety of circumstances, both in England and Scotland: and their adaptation to all kinds of grass and grain crops was fully established.

Owing to the large demand for Reaping Machines, and the very early harvest of 1868, J. & F. HOWARD were quite unable to execute many orders for these machines. In order to prevent disappointment, they are now manufacturing for the coming season a large number of Mowers and Reapers, constructed almost entirely of steel and iron, and carefully fitted on the interchangeable system. Having great strength, they will be found thoroughly efficient and reliable in the field, while the price of the several machines is fixed as low as is consistent with first-class workmanship.

SOME OF THE ADVANTAGES OF

HOWARD'S BRITISH MOWING AND REAPING MACHINES.

1. **Strength, Simplicity, and Compactness.**—The framework is constructed wholly of *iron and steel*, with as few wearing parts as possible, all of which are easy of access, well protected, and readily replaced. There are few bolts and nuts to shake loose in work, half a dozen only being used in the main part of the machines.

2. **Uniformity of Parts.**—In the construction of the several parts a strict and accurate system of gauging is adopted, which ensures that the same parts of all machines of the same pattern are interchangeable; in the event, therefore, of accidental breakage in any part, its renewal may be effected without mistake and loss of time in fitting.

3. **Bevel Gear is used for the First Motion.**—Among Engineers it is well known that spur gear is the best for high speeds, working more smoothly, and with less wear and vibration; hence in HOWARD'S BRITISH MOWERS AND REAPERS bevel gear is used for the slower first motion, and spur gear for the second or quick motion. This arrangement of gearing also affords peculiar facility for altering the speed of the knife, by changing the size of the small spur wheels; and the crank is also thereby brought down so low that the connecting rod works nearly in a right line with the knives and delivers a direct thrust.

4. **Lightness of Draught.**—The machines have a direct draught, and can be worked in any crop at the ordinary speed of the horses. The *side draught*, which is often so great an evil, is obviated by the use of two driving wheels, which allows of the draught pole being placed in the best position to overcome it, and not all on one side, as with a single-wheel machine. The *perfect balance* of the machine prevents any weight from coming on the horses' necks.

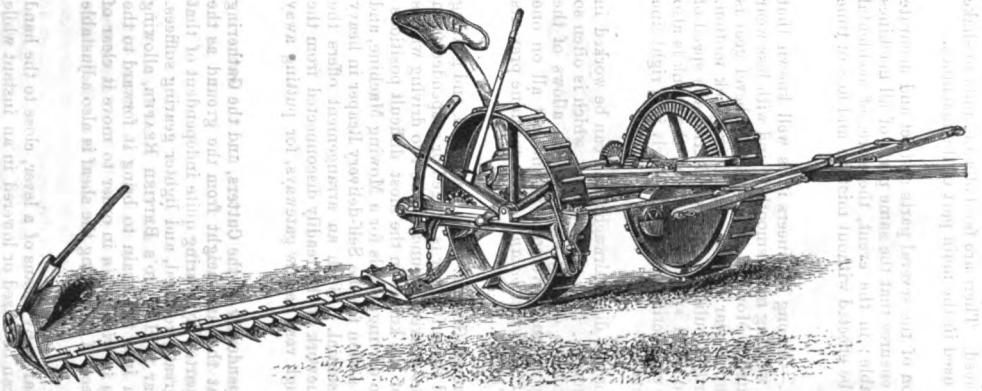
5. **Adaptation to Ridge and Furrow and Uneven Ground.**—The framework and gearing are mounted on two driving wheels, and the cutter bar is hinged or suspended from the former and readily adapts itself to uneven ground. The two driving wheels always ensure the full cutting action of the knives in the most difficult positions. Every one now admits the value of two driving wheels for a Mowing Machine, and in order to ensure a reliable and steady action for the Self-delivery Reaper in heavy crops the two wheels are not less essential. Such an arrangement offers the further advantage of allowing the framework to be readily disconnected from the platform when required to pass through very narrow gateways, for putting away after harvest, and for transport.

6. **The Rakes are driven by Gearing independently of the Cutters, and the Gathering Arms take hold of the standing corn at the same height from the ground as the Rakes.**—As motion to the rakes is imparted by gearing quite independent of that which drives the knives, the strain is greatly reduced, and lighter gearing suffices. The device of the *double cam* is peculiar to HOWARD'S BRITISH REAPER, allowing the gathering arms to drop right down into the grain to bring it forward to the cutters, and causing the gathering arm to *rise again* in order to move it clear of the cut grain on the platform. The speed of delivering the sheaf is also adjustable to suit a light or heavy crop.

7. **Altering the inclination of the Cutter Bar.**—By means of a lever, close to the hand of the driver, the points of the fingers can be raised or lowered in an instant while the machine is in motion. This is a great advantage in cutting laid or tangled grass, and in working on uneven ground.

8. **Position and shape of the Cutter Bar.**—The cutter bar is *behind the driving wheels*, and is therefore drawn or slides over obstructions, instead of being pushed as in the forward cutter, which thus has a tendency to plough the ground. The cutter bar has a raised projection on which the knife vibrates, so that any dirt or grit falls away from it instead of working under the cutters, and thus wearing them out and increasing the draught of the machine. *The fingers clip the cutter bar from side to side;* one bolt holds them firmly in position, and a clear space is left between finger and finger under the bar, a great advantage in low cutting.

HOWARD'S PATENT BRITISH MOWER.



Among the leading features of this Machine are the following:—

The improved solid iron framework, which effectually supports the gearing, and keeps every part permanently true; the gearing is simple and compact.

The driving shafts move in the same plane as the knives.

The connecting rod is so arranged that it always delivers a direct thrust to the knife.

Spur gear being used for the second or quick motion, the Machine works more smoothly than when bevel gear is used.

The speed of the cutters can be readily altered by changing two small wheels.

The cutter bar and its connections form perhaps the most important part of a grass mower; this is so attached to the framework of the machine by the "drag-bar," that it is easily and perfectly controlled by a lever close to the hand of the driver while in motion. The finger bar is hung in the rear of the driving wheels, which position gives it many advantages, some of which are the following:—

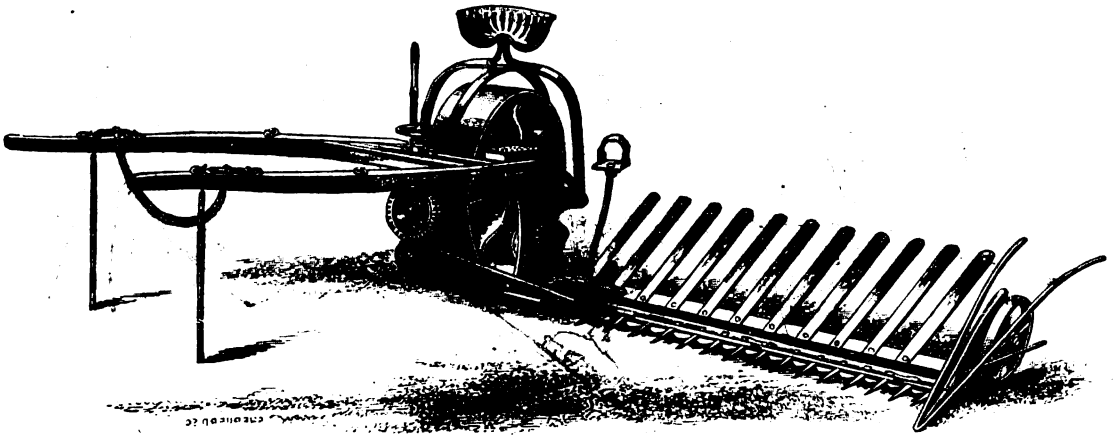
1. It gives the driver an opportunity to see obstructions before the fingers strike them.
2. It avoids the danger of horses backing into the knives.
3. It rises better out of furrows and over ant hills and boggy places.
4. It is the only position which admits of the Machine being changed into a good self-delivery Reaper.

The finger-bar is made of cast steel, the fingers firmly clip it from side to side, and a single bolt holds each in position. The steel finger-bar has a raised rib on its upper surface on which the knife moves, and it thus works above the dirt and grit, which, with the ordinary flat bars, get under the knife and rapidly wear it out, as well as seriously increase the draught.

As this Mower has all the advantages of the machine specially made for reaping, it can be readily converted into a Self-delivery Reaper.

	£	s.	d.
Price, complete, with tool box, containing all requisites for use in the field, extreme width 8½ feet...	20	0	0

HOWARD'S PATENT ONE-HORSE BRITISH REAPER, WITH BACK DELIVERY.

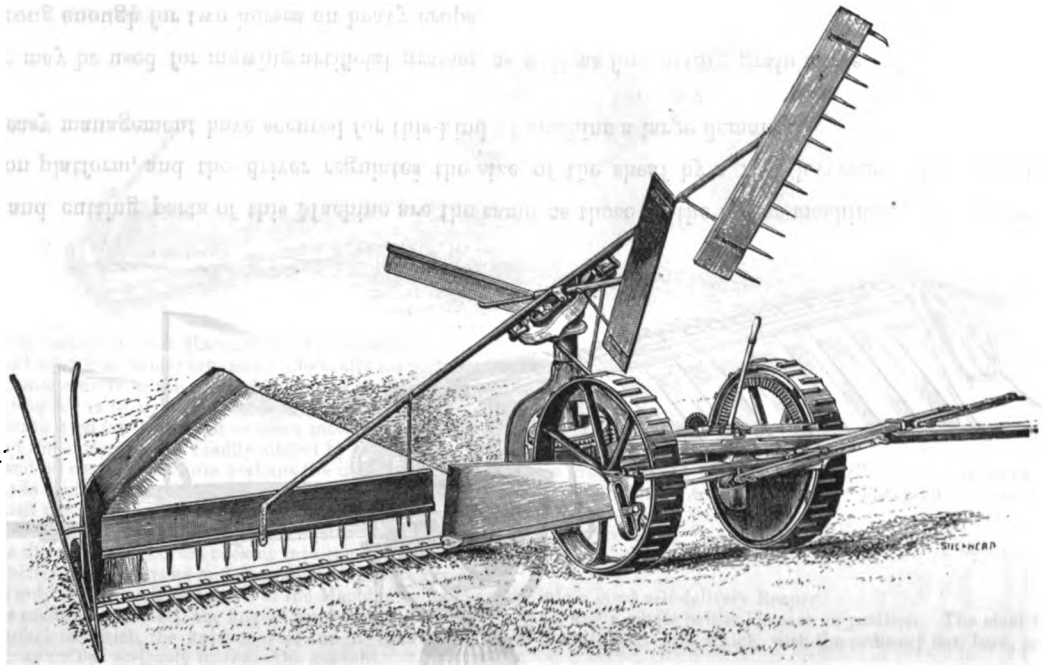


The gearing and cutting parts of this Machine are the same as those of the larger machines. The grain, as it is cut, falls on to a skeleton platform, and the driver regulates the size of the sheaf by a foot leverage. The comparative cheapness, simplicity, and easy management have secured for this kind of machine a large demand.

This Machine may be used for mowing artificial grasses, as well as for cutting grain crops. It is of easy draught for one horse, and is strong enough for two horses on heavy crops.

	£	s.	d.
Price, complete, with tool box, containing all requisites for use in the field, extreme width 7¼ feet	16	10	0

HOWARD'S PATENT BRITISH REAPER, WITH SELF-ACTING DELIVERY.



For description see following page.

The above Machine has the same advantages of the solid iron framework and gearing as the Mowing Machine before described, and like that machine Howard's British Self-delivery Reaper has two travelling wheels, the importance of which arrangement has not yet been fully recognised in this country. The two wheels carry the weight of the frame and gearing, and give firmness and steadiness to the whole machine: by the use of two wheels, operating together or independently, short turns can be made without clogging or stopping the knives,—the necessity for stopping to back the machine at the corners is obviated,—and the broad bearing surfaces of the wheels give ample driving power, and prevent sinking on soft ground. The value of two driving wheels for a mowing machine is now generally admitted, and in order to insure a reliable and steady action for the Self-delivery Reaper in heavy crops, the two driving wheels are not less essential; with an independent motion of the platform they allow the Reaper to adapt itself to ridge and furrow and uneven ground. Such an arrangement offers the further advantage of allowing the framework to be readily disconnected from the platform when required to pass through very narrow gateways, for putting away after harvest, and for transport.

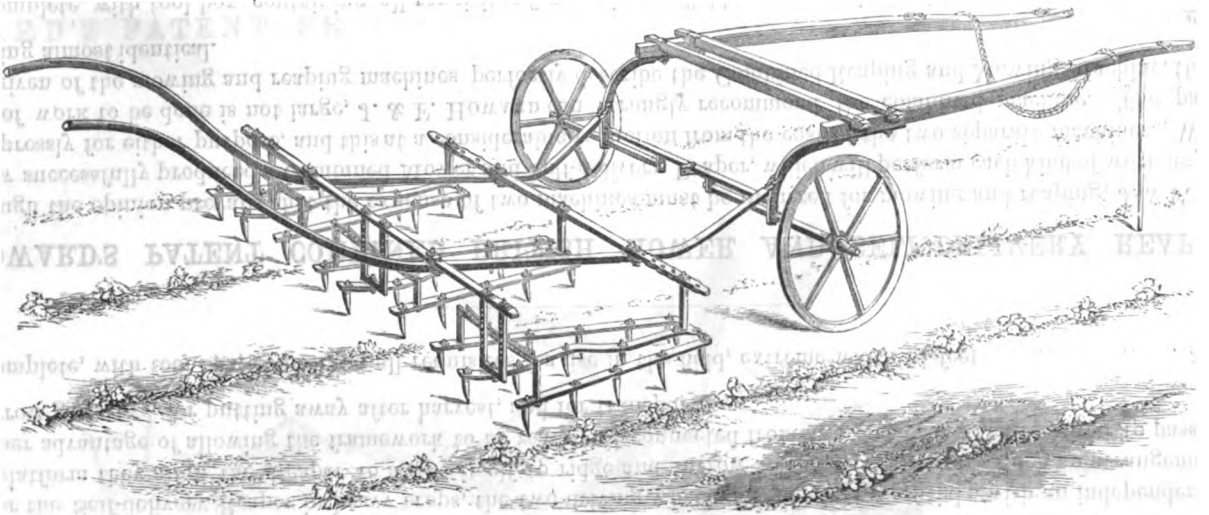
	£	s.	d.
Price, complete, with tool box, containing all requisites for use in the field, extreme width 8½ feet	30	0	0

HOWARD'S PATENT COMBINED BRITISH MOWER AND SELF-DELIVERY REAPER.

Although the opinion prevails that the expense of two machines must be incurred for mowing and reaping, J. & F. Howard have now successfully produced a Combined Mower and Self-delivery Reaper, which will perform each kind of work as well as if made expressly for either purpose, and this at a considerable reduction from the cost of the two separate machines. Where the amount of work to be done is not large, J. & F. Howard can strongly recommend the combined machine. The particulars already given of the mowing and reaping machines perfectly describe the Combined Reaping and Mowing Machine, the several parts being almost identical.

	£	s.	d.
Price, complete, with tool box, containing all requisites for use in the field, extreme width 8½ feet	37	10	0

HOWARD'S IMPROVED PATENT TURNIP HARROW.

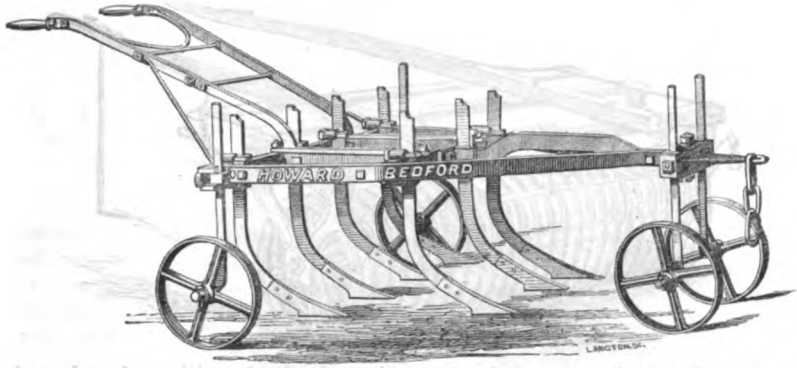


The above implement cleans two or three rows of turnips at once. It works close up to the growing plants, cutting off the weeds, and, what is more important, it checks the ravages of the fly; it has been found that these troublesome insects will not stay where this harrow is kept at work.

It may be advantageously used as soon as the young plants are above the ground; and after storms, to break the crust and expose a fresh surface of earth; it can also be often used with better effect than a Horse Hoe. It is adapted for the flat as well as ridge, can be expanded or contracted to suit the width of the rows, and with it a man and horse will do about 10 acres a day.

	£	s.	d.
Price, for two rows	4	5	0
Price, for three rows	5	10	0

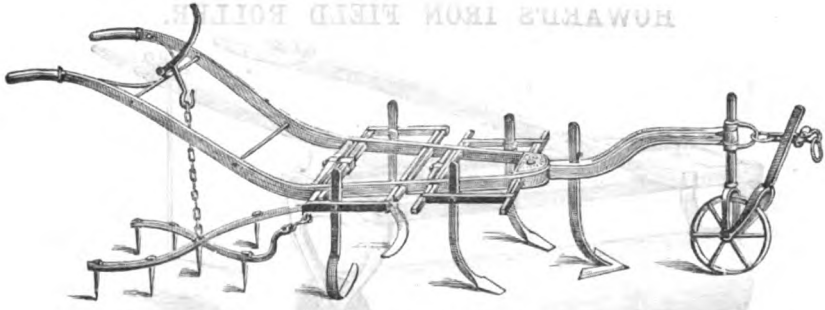
HOWARD'S WROUGHT-IRON SCARIFIER.



This implement is made entirely of wrought iron; the tines can be placed nearer or farther from each other according to the state of the land, and are so formed that they do not cut or break the "*couch*" into short lengths, but draw it from the soil and deliver it on the surface. When using this implement it is desirable to scarify the headlands first.

	£	s.	d.
Price, with 5 tines, average weight 3¼ cwt.	5	15	0
Price, with 7 tines, average weight 4¼ cwt.	6	15	0
Price, with 9 tines, average weight 4¾ cwt.	7	15	0
Price, with 11 tines, average weight 5 cwt.	8	15	0

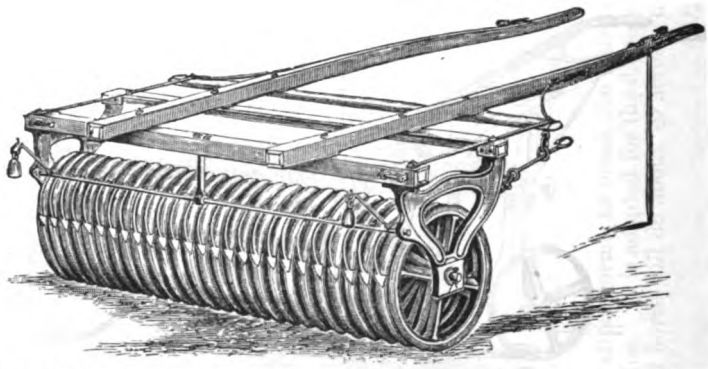
HOWARD'S EXPANDING HORSE HOE.



This implement is intended for one row of turnips, potatoes, or beans, or for three rows of wheat, barley, &c. The hoes are made to suit the different widths of the rows, and are so arranged that the frame never projects beyond the outside hoes. The advantage of this arrangement is very great when hoeing high-standing crops. It is fitted with an expanding harrow, which works behind the implement, and brings the weeds to the surface. It is also furnished with two grubbers for stirring the soil to a greater depth than can be done by the hoes.

	£	s.	d.
No. 3, with 3 shares, average weight 1 cwt.	**2**	**15**	**0**
No. 5, with 5 shares, as above, average weight 1¼ cwt.	**3**	**10**	**0**
If with expanding harrow, as above ... ... extra	**0**	**10**	**0**

HOWARD'S PRESS-WHEEL ROLLER.



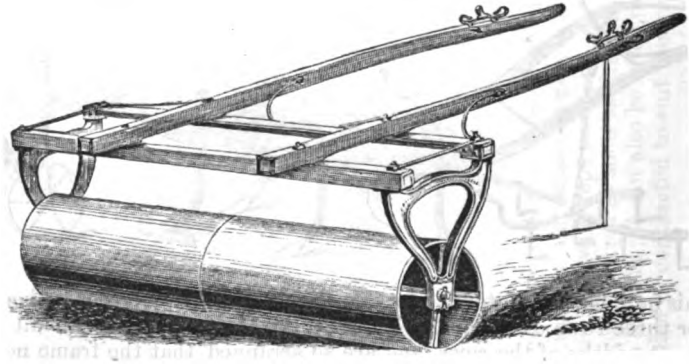
This Roller is composed of a series of wheels, with wedge-shaped rims revolving separately. For crushing clods, and rolling corn when three or four inches out of the ground, upon land infested with wire-worm and grub, it is a very effective implement. The frame is made of strong wrought angle-iron, and the bearings of lignum-vitæ. The scrapers, as shown in the above engraving, will be found very useful, especially on adhesive soil; for, by their use, a slight shower will not put a stop to the work.

	15 in. diameter.			20 in. diameter.			26 in. diameter.		
	£	s.	d.	£	s.	d.	£	s.	d.
6 feet wide	10	0	0	11	10	0	14	10	0
7 feet wide	11	0	0	12	10	0	16	10	0
8 feet wide	12	0	0	14	10	0	18	10	0

Scrapers, as above, 30s. extra. Double shafts, 25s. extra.

The 7-feet Roller, at £16 10s., is recommended as the most useful size.

HOWARD'S IRON FIELD ROLLER.

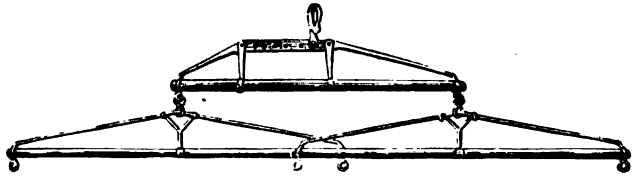


This Roller is made with strong wrought angle-iron frame, wood shafts, turned spindle, lignum-vitæ bearings, and extra strong iron cylinders.

	£	s.	d.
12 inches diameter; average weight, 8 cwt.	8	8	0
14 inches diameter; average weight, 9¼ cwt.	9	9	0
16 inches diameter; average weight, 10½ cwt.	10	10	0
18 inches diameter; average weight, 11¼ cwt.	12	12	0
20 inches diameter; average weight, 12 cwt.	14	14	0
24 inches diameter; average weight, 15 cwt.	16	16	0

Can be had with double or shifting shafts, or with boxes to weight the roller.

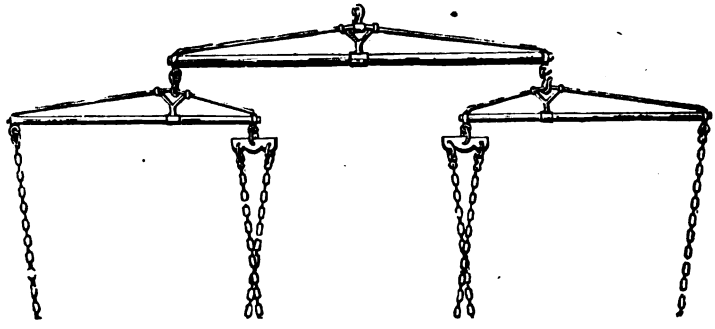
HOWARD'S TRUSSED WHIPPLETREES.



The above are recommended for their great strength, lightness, and durability. The hinder whippletree is made with a hake, so that the set can be used with three horses at plough—two in the furrow and one on the land—as well as with a pair abreast; or, when a colt or weaker horse is used by the side of a stronger one, the draught can be regulated accordingly. They are sufficiently strong for four horses.

	£	s.	d.
Price, with wood bars	0	11	6
Price, with tubular iron bars, as above	0	17	6
Price, with tubular iron bars, for four horses abreast...	2	10	0

HOWARD'S THREE-HORSE EQUALIZING WHIPPLETREES.



These are made of tubular iron, and are also upon the trussed principle. They are very strong, and are intended for three horses abreast at plough.

	£	s.	d.
Price	1	6	0

HOWARD'S FOUR-HORSE WHIPPLETREES.

These are similar to the preceding. A middle chain is passed round a pulley attached to the head of the plough or other implement; the fore horses are hooked to one end of the chain, and the hinder horses to the other end, so that no power is lost; the draught of either horse always telling directly upon the traction of the implement.

	£	s.	d.
Price	2	10	0
Price, if made for a six-horse team	3	15	0

J. & F. HOWARD

PAY CARRIAGE AS FOLLOWS,

On all Goods, except Steam Cultivating Machinery and Safety Boilers, when they amount to not less than Twenty Shillings.

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To nearly all Stations in England and Wales.

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Belfast	Dundalk
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And for 2½ per cent. to

Armagh	Dundrum	Nenagh
Athlone	Dungarvan	Newbridge
Athy	Enniskillen	Newtown Butler
Bagnalstown	Fermoy	Omagh
Ballyboy	Kildare	Parsonstown
Bambridge	Kilkenny	Portadown
Belturbet	Killarney	Port Arlington
Carlow	Kilmallock	Rich Hill
Castleblayney	Knocklong	Roscrea
Cavan	Limerick Junction	Sallins
Charleville	Lisnaskea	Strabane
Clara	Mallow	Templemore
Clones	Maryborough	Thurles
Coote Hill	Monaghan Road	Tralee
Cork	Monaghan	Tullamore
Donaghmore	Monasterevan	Tynan

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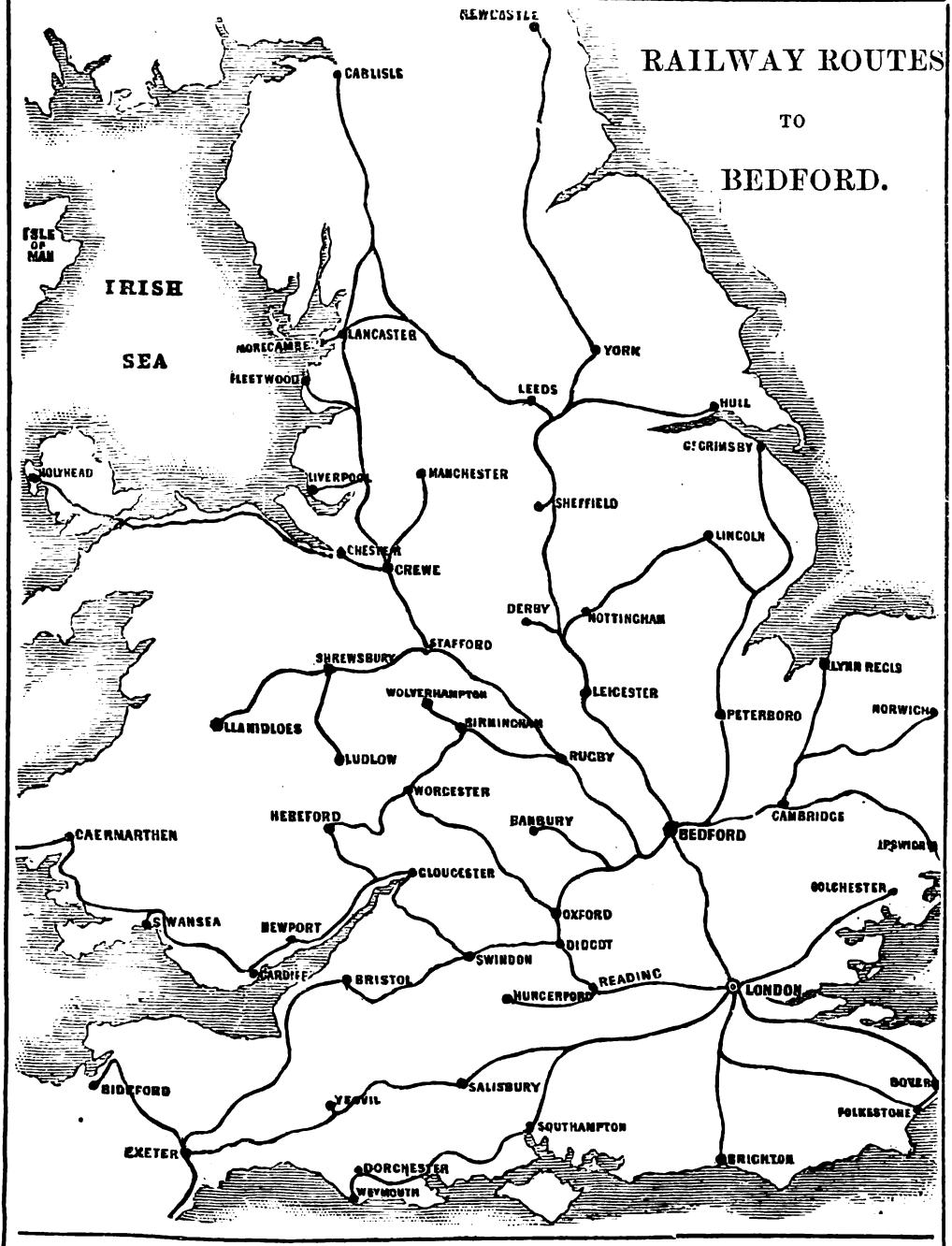
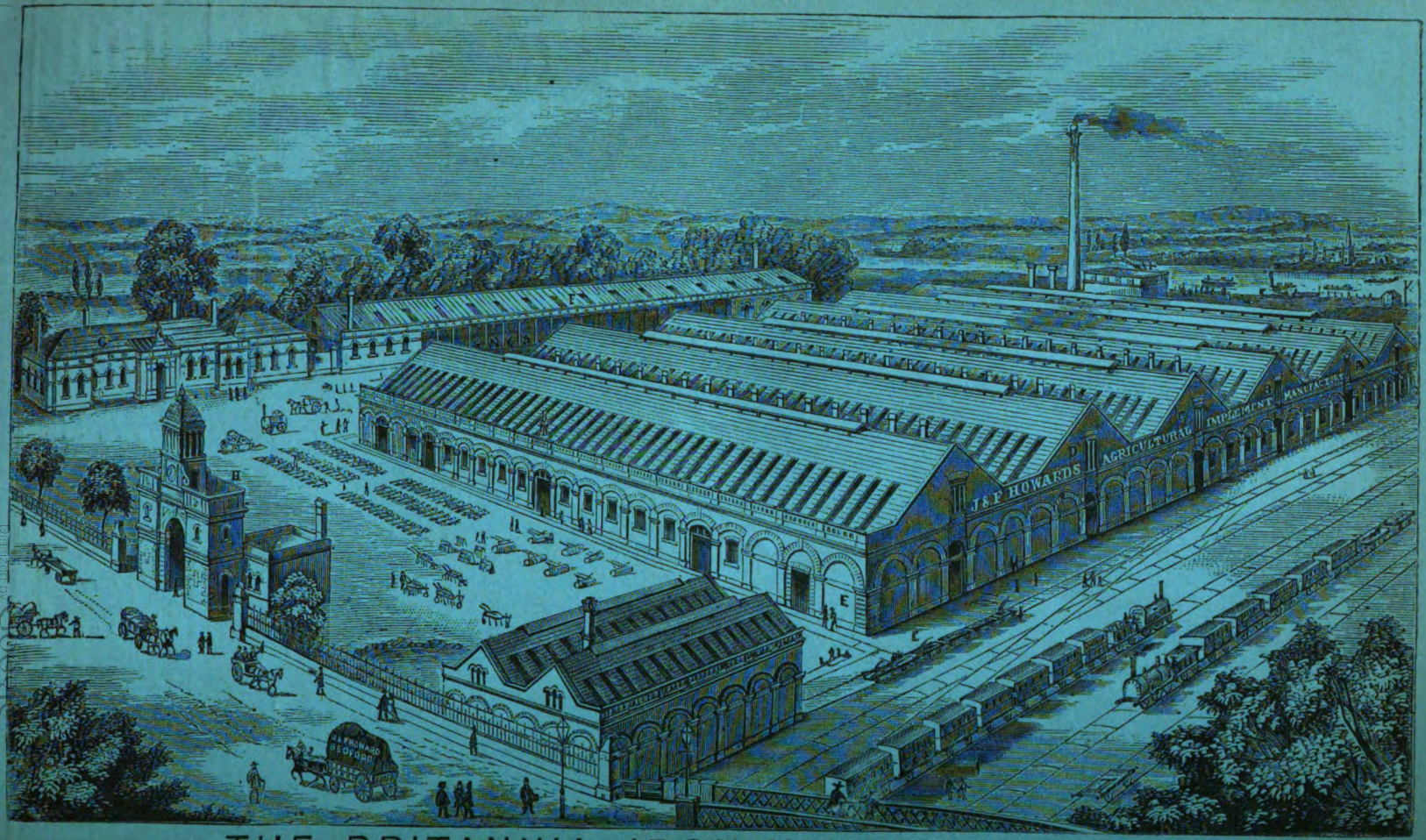
RAILWAY ROUTES TO BEDFORD.



TIME OCCUPIED IN TRAVELLING TO BEDFORD.

BIRMINGHAM, from New Street Station	2¾ hours.
BRISTOL, from Great Western Terminus	5 hours.
CAMBRIDGE	1 hour.
CARLISLE, via Ingleton	7¾ hours.
LEEDS, from Wellington Station	4¼ hours.
LIVERPOOL, from Lime Street Station	5¼ hours.
LONDON, from St. Pancras Station	1 hour.
OXFORD	2 hours.



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